

HINERY  
e business  
n produc-  
of lower  
rebuild-  
business  
ach Pres-  
e, Mich.  
est non-  
repair of  
plant has  
week and  
intervals  
provides  
utomotive  
and other  
es not re-  
but on a  
the basis  
hop rates  
Jobs in-  
welding  
gears and  
and re-  
of a cur-  
the floor is  
f a 1200-  
about 72  
ing a new  
or connect-  
the entire  
any pres-  
ess rough-  
e produc-  
f about 2  
duction is  
se, Punch  
aller jobs  
be turned  
ere with  
big cus-  
e business  
equests to  
machinery  
either a  
were in a  
The ma-  
ught sole  
possession  
to Punch  
kable con-

# the IRON AGE

A CHILTON

PUBLICATION

NATIONAL METALWORKING WEEKLY

May 1, 1952

REV. OF MICHIGAN  
MAY 2 1952  
DETROIT LIBRARY  
or manufacturing  
economies use  
pre-coated

Thomas Strip

**Thomas Strip** 

Cold-rolled strip steel electrolytically pre-coated with Zinc, Copper, Brass, Nickel, Lead-Alloy, and Chromium in Natural, Planished and Buffed Finishes—Hot Dip Tin and Lead Alloy Coated—Lacquer Coated in Colors—Annealed Spring Steel—Alloy Strip Steel—Uncoated Strip Steel. Carefully produced to your specifications.

a product of **Pittsburgh Steel Company**

Thomas Strip Division • Warren, Ohio



Every small worm gear unit is built to precision standards—as outstanding in quality and performance as larger size Clevelands.

Illustrated above are the 10 AT (left) and 00 D (right) speed reducers.

## Enjoy the benefits of worm gear drives in smaller CLEVELAND speed reducers

WHEN you want a quiet, powerful, dependable drive for a small machine, choose a Cleveland Worm Gear Speed Reducer.

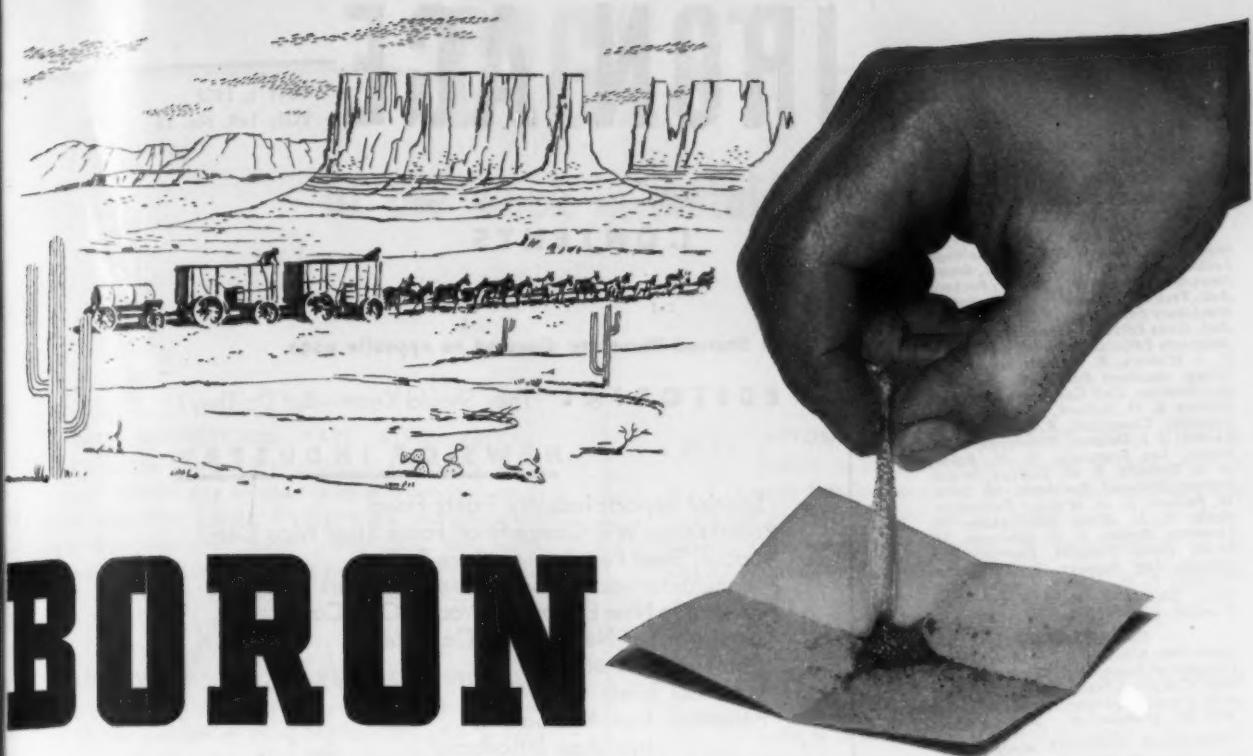
As built by Cleveland, the worm gear reducer is a drive of many advantages:

1. It is compact and inherently quiet, transmitting power with smooth, uninterrupted torque flow.
2. Its right-angled design saves valuable space.
3. It has a minimum of moving parts.
4. Shock load resistance and other factors of safety are high.
5. Rate of wear of case hardened steel worm on nickel-bronze gear is very low, insuring long life.

Write for Bulletin 114F which illustrates and gives engineering data on smaller size Clevelands—many now available for immediate delivery. The Cleveland Worm and Gear Company, 3252 E. 80th St., Cleveland 4, O.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

**CLEVELAND**  
Worm Gear  
Speed Reducers



# BORON

*increases hardenability  
of alloy steels*

When boron is used in an alloy steel it increases the depth to which the steel will harden when quenched. This result is limited to sections in sizes that can be liquid-quenched effectively.

Only a few thousandths of 1 pct of boron is all that it takes to intensify the effects of the other hardening alloys in steel. Boron does not completely replace these other elements but it does reduce the quantity needed to produce a given depth hardness.

This means that boron, of which the nation has an ample supply, can conserve such alloying elements as nickel and molybdenum that are in the critical-shortage category. It also means that boron-treated steels are effective alternates for many of the constructional alloy steels that would normally be used by civilian as well as the nation's defense supporting industries.

Boron steels usually require closer temperature control for heat-treatment than is required with ordinary high-alloy steels, but aside from this they present no special problems. Their cold- and hot-working properties are equal or better than those of ordinary alloy steels. They also have improved machinability because of their lower alloy content.

Bethlehem manufactures boron steels in addition to regular alloy grades, special and carbon steels. If you need information on analysis or heat-treatment of steel for any purpose, our metallurgists will be glad to help. Write or phone giving complete details of your problem.

BETHLEHEM STEEL COMPANY  
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

**BETHLEHEM ALLOY STEELS**



# IRON AGE

MAY 1, 1952  
VOL. 169, No. 18

**THE IRON AGE**  
Editorial, Advertising and Circulation  
Offices, 100 E. 42nd St., N. Y., 17, N. Y.

**GEORGE T. HOOK**, Publisher  
**TOM C. CAMPBELL**, Editor

**EDITORIAL STAFF**

**Managing Editor** George F. Sullivan  
**Technical Editor** Darwyn I. Brown  
**News-Market Editor** Wm. V. Packard  
**Asst. Technical Editor** W. G. Patton  
**Machinery Editor** George Elvers  
**Ass't News Editor** Theodore Metaxas  
**Associate Editors:** H. W. Van Camp,  
F. J. Winters, R. L. Hatschek, W. B.  
Olson; **Assistant Editor**, G. G. Carr;  
**Art Director**, Carl Cerninero; **Regional  
Editors**: K. M. Bennett, Chicago; E. C.  
Beaudet, Cleveland; R. D. Raddan,  
Detroit; J. E. Delaney, Pittsburgh; T. M.  
Rohan, San Francisco; G. H. Baker,  
A. K. Rannels, R. M. Stroupe, Wash-  
ington; **Editorial Assistants**, M. Brass,  
M. Perrone, C. M. Walker; **Correspon-  
dents**: F. L. Allen, Birmingham; N.  
Levenson, Boston; R. M. Edmonds, St.  
Louis; James Douglas, Seattle; Jack  
Adams, Los Angeles; F. Sanderson,  
Toronto; F. H. Harley, London, Eng-  
land; **Chilton Editorial Board**: Paul  
Wooton, Washington.

**BUSINESS STAFF**

**Production Manager** B. H. Hayes  
**Director of Research** Oliver Johnson  
**Mgr. Circul'n & Promotion** C. T. Post  
**Asst. Promotion Mgr.** James A. Crites  
**Asst. Dir. of Research** Wm. Lambeir

**REGIONAL BUSINESS MANAGERS**  
B. L. Herman, Philadelphia; Stanley J.  
Smith, Chicago; Pearce Lewis, Detroit;  
Paul Bachman, New England; Charles  
R. Lippold, Cleveland; R. Raymond  
Kay, Los Angeles; C. H. Ober, New  
York; J. M. Spackman, Pittsburgh;  
W. C. Walters, Southern; Harry Becker,  
European Representative.

**REGIONAL OFFICES**  
Chicago 3, 10 S. LaSalle St.; Cleveland  
14, 1016 National City Bank Bldg.; De-  
troit 2, 103 Pallister Ave.; Los Angeles  
28, 2420 Cheremoya Ave.; New England,  
62 LaSalle Rd., W. Hartford 7; New  
York 17, 100 E. 42nd St.; Philadelphia  
39, 56th & Chestnut Sts.; Pittsburgh 22,  
814 Park Bldg.; San Francisco 3, 1355  
Market St.; Washington 4, National  
Press Bldg.; Southern, 1801 Woodcliff  
Terr., Atlanta, Ga.; European, 111 Thor-  
ley Lane, Timperley, Cheshire, England.

**Circulation Representatives:** Thomas  
Scott, James Richardson.

**One of the Publications Owned and  
Published by Chilton Co., Inc., Chest-  
nut & 56th Sts., Philadelphia 39, Pa.**

**OFFICERS AND DIRECTORS**

**JOS. S. HILDRETH**, President  
**Vice-Presidents**: Everit B. Terhune, G.  
C. Butby, P. M. Fahrendorf, Harry V.  
Duffy; William H. Valler, Treasurer;  
John Blair Maffett, Secretary; Maurice  
E. Cox, George T. Hook, Tom C.  
Campbell, Frank E. Tighe, L. V. Row-  
lands, Directors. **Asst. Treas.** George Malswinkie,

**Indexed in the Industrial Arts Index**  
and the Engineering Index. Published  
every Thursday by the CHILTON CO.  
(INC.), Chestnut & 56th Sts., Phila-  
delphia 39, Pa. Entered as second class  
matter, Nov. 8, 1932, at the Post Office  
at Philadelphia under the act of March  
3, 1879. \$8 yearly in United States, its  
territories and Canada; other Western  
Hemisphere Countries, \$15; other For-  
eign Countries, \$25 per year. Single  
Copies 35c. Annual Review and Metal  
Industry Facts Issue, \$2.00. Cable ad-  
dress "ironage" N. Y.



Audit Bureau  
of  
Circulations



Society of  
Business Magazine  
Editors



Controlled  
Circulation  
Audit



National  
Business  
Publications

Copyright, 1952, by Chilton Co. (Inc.)

## CONTENTS

\* Starred items are digested on opposite page.

**EDITORIAL** They Should Know—But Do They? 1

## NEWS OF INDUSTRY

Special Report: Industry Fights Flood	89
*Marketing: Will Competition Force Steel Price Cuts?	92
*Labor: Steel People Snub Price Bait	93
*Manufacturing: Try Substitute Brightwork on Autos	94
*Research: New Enameling Process Cuts Costs	95
*Controls: Set New Freight Car Goals	96
Defense Contracts	101
Industrial Briefs	123
Personnel: Iron Age Salutes	125
Iron Age Introduces	127
Clearing House	212

## NEWS ANALYSIS

Newsfront	87
*This Week in Washington	109
Canadian Comment	112
*Automotive Assembly Line	114
West Coast Report	119
Machine Tool Highspots	121

## TECHNICAL ARTICLES

*How Does Titanium Scale At High Temperatures?	133
Hot Extrusion Solves Production Problems	139
*Rare Earths Improve Properties of Many Ferrous Metals Part II	140
*Modern Quality Controls Are Simple To Use	144
Aluminum Foil for Corrosion Resistance	147
How To Get The Most From Your Milling Machines	148
New Books	151
Ion Exchange Saves Chromium, Chromic Acid	152

## MARKETS & PRICES

*The Iron Age Summary—Steel Outlook	189
Market Briefs	191
Nonferrous Markets	192
Iron and Steel Scrap Markets	196
Iron and Steel Scrap Prices	198
Comparison of Prices	200
Steel Prices	202
Warehouse Prices	205

## REGULAR DEPARTMENTS

Dear Editor	9
Fatigue Cracks	11
Conventions and Meetings	13
Free Publications	155
New Equipment	159

## INDEX OF ADVERTISERS

THE IRON AGE

# DIGEST

## of the week in metalworking

7  
PAGE WILL COMPETITION PARE STEEL PRICES?  
92 One of the most bitter scrambles in the history of the  
steel industry may be sparked by a return to a rough  
and tumble competitive market. Producers are staring straight  
at already high break-even points, rising costs, less profit.  
Steel men know they'll have to absorb freight in a soft market.

101  
123 PAGE STEEL WON'T BITE ON PUNY OPS INCREASE  
125 93 The steel industry was not expected to be maneuvered  
127 into the position of accepting an OPS offer to raise  
212 prices by not quite \$3 a ton. This OPS permitted increase is  
nothing more than what the industry's entitled to for rising  
costs to July '51. It does not include a rise for wage boosts.

87  
109  
112  
114  
119  
121 PAGE HOW GOOD IS SUBSTITUTE CAR BRIGHTWORK?  
94 Detroit has had to scramble to offset shortages and  
outfit autos with the usual amount of chrome. Bright-  
work isn't what it used to be but the customer himself may be  
largely responsible if corrosion resistance is too far below what  
it was. Engineers hope car owners don't scrub off new lacquers.

133  
139  
140  
144  
147  
148  
151  
152 PAGE INDUSTRY TESTS ONE-COAT ENAMELING  
95 Appliance plants are now testing a new process for  
applying one coat of porcelain enamel directly to  
non-premium steel. It promises to be a significant forward  
stride for the enameling industry. Called the Ferro-Republic  
process, it eliminates a ground coat and results in savings.

189  
191  
192  
196  
198  
200  
202  
205 PAGE DTA SETS NEW FREIGHT RAIL CAR GOALS  
96 Goals for production of railroad freight cars have  
been shoved higher for the next 3 years following the  
latest survey of Defense Transport Administration. Carbuilders  
must produce 438,500 cars for domestic use by July 1, 1955. Ex-  
port, military needs are extra. Success hinges on metals supply.

9  
11  
13  
155  
159 PAGE PLAY ELECTION YEAR POLITICS ON CONTROLS  
109 Sometimes election year political maneuvering to  
strengthen the party's chances nullifies the principles  
of good government. Today, political expediency is affecting  
Congressional action on controls. The legislators feel that this  
is no time to risk a wrong vote on putting an end to controls.

114 PAGE AUTOMAKERS WEIGH PRICE RISE WISDOM  
Detroit auto producers are tempted to raise prices as  
costs threaten to climb. But their reluctance to do so  
is caused by buyer resistance to going price tags. Auto-  
makers realize steel prices are due for some sort of an in-  
crease. A steel rise will also start parts prices on upswing.

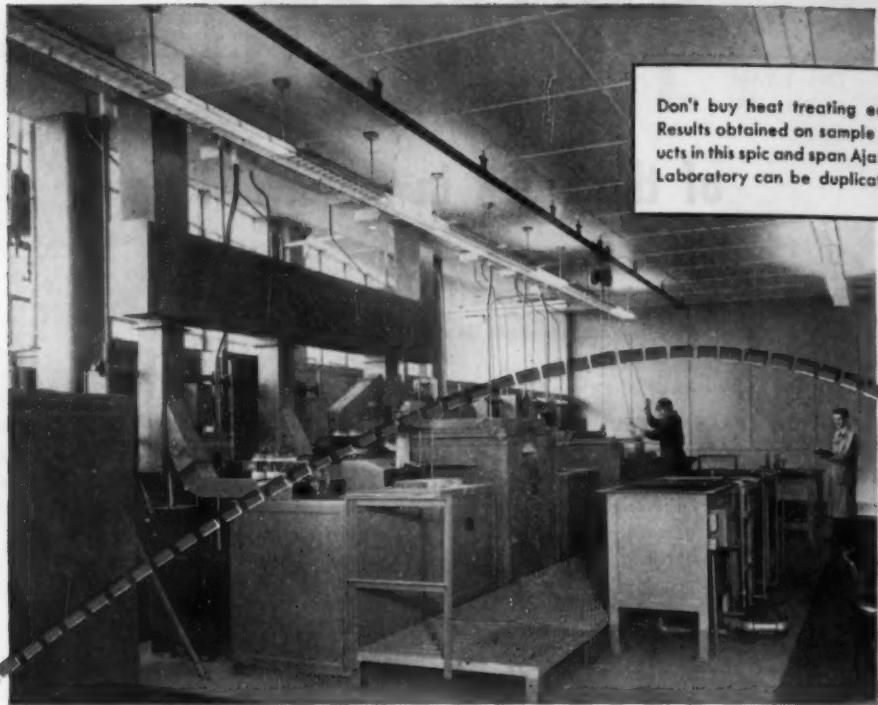
133 PAGE HIGH TEMPERATURE SCALING OF TITANIUM  
At 850 to 1000° C, a transition from a primary light  
scale to a black scale has been observed. This prod-  
uct of oxidation was composed of 5 layers, and accompanied  
by a change from a low scaling rate to a higher one. Titanium  
from other sources acted similarly but showed no transition.

140 PAGE RARE EARTH INFLUENCE ON FERROUS ALLOYS  
Lan-cer-amp treated steel castings show higher im-  
pact and ductility in quenched and tempered condi-  
tion than untreated heats. Transverse impact values of forgings  
have been increased with rare earth additions. Treated metal  
has increased fluidity, and Type 310 shows less grain coarsening.

144 PAGE MODERN QUALITY CONTROLS ARE SIMPLER  
Statistical methods have evolved into simple, helpful  
quality control tools. They help businessmen produce  
an item or service of acceptable quality at a profit. Control  
charts point out quality levels, indicate impending trouble,  
and give a basis for establishing or altering specifications.

189 PAGE STEEL USERS LOOK PAST TIGHTER MARKET  
The steel market is tighter this week. But consumers  
are optimistic over their supply outlook. They expect  
the high rate of production to shift the supply-demand balance  
soon. Most kept their inventory reserves nearly intact through  
short shutdown. Expect keen competition among steel mills.

NEXT  
WEEK PAGE QUALITY CONTROL REQUIRED BY AIR FORCE  
It pays to know the Air Force's revised quality control  
specifications. The revised version can save time and  
money and cut through red tape. Shop men and engineers get  
a break on new design work. A legal angle has been settled.  
Other services may also adopt this Air Force specification.



Don't buy heat treating equipment blindfolded! Results obtained on sample batches of your products in this spic and span Ajax Metallurgical Service Laboratory can be duplicated in your own plant.

# Say Goodbye to Guesswork ON HEAT TREATING RESULTS AND COSTS!

Without charge or obligation, the Ajax Metallurgical Service Laboratory will treat specimen parts by any of the following processes:

- CARBURIZING
- CYANIDE HARDENING
- NEUTRAL HARDENING
- ANNEALING OR HARDENING STAINLESS STEEL
- BRAZING
- HARDENING HIGH SPEED STEEL
- AUSTEMPERING
- MARTEMPERING
- PROCESS ANNEALING
- CYCLIC ANNEALING
- SOLUTION HEAT TREATMENT
- DRAWING (Tempering)
- DESCALING, CLEANING
- DESANDING

What about the quality of the finished work? Will it be scale-free, devoid of decarb? Will the heat treatment prevent distortion and thereby reduce or eliminate costly grinding or finish machining operations? How much production will the furnace give per hour, and what floor space will be needed? What will the power, labor, maintenance and other heat treating costs amount to? In short, will your proposed new furnace live up to the manufacturer's enthusiastic claims for it?

You can be absolutely sure on all of these points before you buy an Ajax Electric Salt Bath Furnace for these reasons:

1—No Ajax salt bath furnace is ever sold until Ajax engineers—backed with experience in over 3,000 installations—are convinced it will do the job to your entire satisfaction as well as to theirs.

2—Before buying, we strongly urge that you utilize the facilities of the full commercial scale Ajax Metallurgical Service Laboratory. Send or bring batch lots of your materials for heat treating under actual working conditions. Let us prove beyond any question of doubt what can be done, how it can be done, and under exactly what conditions.

3—Once your furnace is installed, an Ajax engineer will visit your plant to double check, to instruct, and to make sure that on-the-job operation fully matches your expectations.

This policy has resulted in the most outstanding patronage ever accorded any heat treating furnace, both in the importance and number of users. A list of users is available on request. The high percentage of customers who have re-ordered Ajax heat treating equipment is unparalleled in the furnace industry.

**AJAX ELECTRIC COMPANY, Inc.**

World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively

904 Frankford Avenue

Philadelphia 23, Pa.



**AJAX**  
HEAT TREATMENT

**ELECTRIC SALT BATH FURNACES**

## They Should Know—But Do They?

WITH a delayed reaction many businessmen are now realizing that the steel seizure affects them also. The reaction may have been *too* delayed. Even when these men got the gist of the threat in the steel seizure they were "not quite sure."

Conversations with many people who should know better cast a deep gloom on the ultimate ability of steel—or any other industry—to combat disinterestedness. Some key men from other industries seem uninterested in what is happening to steel. They either boast of this condition, criticize steel or don't see the connection.

This is not an editor's hallucination. It is the sad truth. Some people say, "Well, the steel firms are making a lot of money, why should I worry?"

Those people should know that it takes millions for ore development, for other raw materials, for expansion, for taxes, for wages, for stockholders and for future security of the industry. Without profit there can be nothing but a quick drift to complete socialism.

Now about the fellow who says, "It is the steel companies' own fault. They had it coming to them." There are a lot of so-called businessmen saying that too—but they don't have the facts.

Then you have the fellow who takes a "long term" view and says, "This is just a little battle. It is not serious. We will work out of it without too much trouble." He is whistling in the dark.

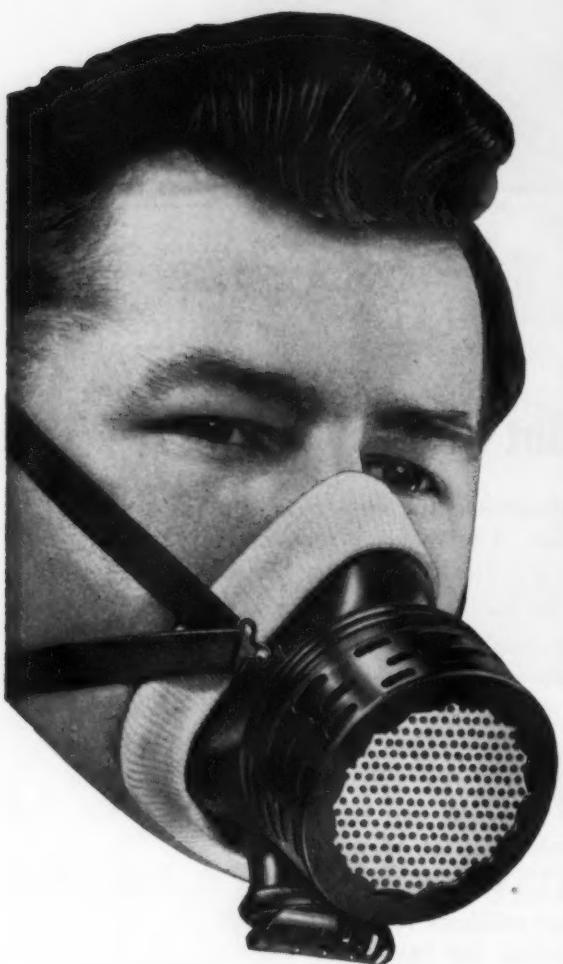
You have the historian type who quotes you other Presidents, "Yes, I know it sounds serious but after all it was done before and will be done again. There is nothing new in it." That, from one who looks backward not forward.

You have some steel company customers who are so close to personal differences over orders or deliveries that they lose sight of the "seizure" omen. It is so close they think it is remote—they can't recognize it.

The fight that steel is putting up is not a fight for the steel industry alone. It is the fight of every businessman and industrialist who wants to stay in business without a government rope around his neck.

*Tom Campbell*

*Editor*



## 1 FACE PIECE— 7 CARTRIDGES

(Quickly Interchangeable)

Protect against Dusts, Gases and Vapors

**WITH THE AO R2000 RESPIRATOR**

When a variety of hazardous vapors, gases or dusts are a problem, you can now simplify the protection and save money by standardizing on the AO R2000 Respirator. Its single, basic face piece accommodates four chemical cartridges of NON-SPARKING metal and three dust cartridges which, while light in weight for comfort, have maximum filtering capacity. CARTRIDGES INTERCHANGE WITH A TWIST OF THE WRIST—one twist removes outer cover, a second replaces it. Respirator may also be used with highly efficient, chemically-treated disposable dust filter.

Your nearest AO Safety Products  
Representative can supply you

SOUTHBRIIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



### QUICK RESPIRATOR FACTS

- Face mask molded from pliable rubber.
- $\frac{3}{8}$ " rubber headband.
- Inhalation valve of pure gum rubber freely admits air at lightest intake of breath, seals tightly on exhalation.
- Exhalation valve cannot stick, completely expels air—moisture cannot collect, dust cannot enter.
- Disassembly for cleaning is easy without special tools.

# Dear Editor:

## Letters from readers

### Truman's Tantrum

Sir:  
Your Apr. 17 editorial "Truman's Tantrum" most certainly will have the endorsement of every business man in the country. It is just unfortunate that it will not reach the right people, or at least not enough of them.

G. E. PARKER  
President

Columbia Steel & Shafting Co.  
Pittsburgh

### Mail Bag Response

Sir:  
Thank you for your recent assistance in obtaining tear sheets from one of THE IRON AGE articles. However, if you continue to publish such interesting articles then you will have to live with the requests for copies.

Will you be kind enough to send us two copies of the article "Vapor Deposition May Solve Today's Coating Problems" which appeared on p. 113 of your Apr. 10 issue.

H. W. COOPER  
Development Metallurgist  
Superior Tube Co.  
Norristown, Pa.

### Roll Forming

Sir:  
Will you kindly let us know if there is any published information on the design and building of rolled forms for the forming of hot and cold-rolled steel strip.

I am familiar with several books on tool and die making but none of them have any information on the rolled forming of sheet strip through a set of progressive rolls.

J. WENDLING  
President  
Vento Steel Products Co., Inc.  
Buffalo

Quite a comprehensive article entitled "Designing Tools For Cold Roll Forming" appeared on p. 83 of our Nov. 3, 1949 issue. Should you require additional information we suggest you write to the Yoder Co., West 58 St. & Walworth Ave., Cleveland 2, Ohio.—Ed.

### Thickness Gage

Sir:  
We would like to have some information on the instrument suitable for measuring ceramic coatings mentioned on p. 154 of your Apr. 10 issue.

J. G. BITTNER  
Purchasing Agent  
Ingram-Richardson Mfg. Co.  
Beaver Falls, Pa.

For further details write to the Ryan Aeronautical Co., Lindbergh Field, San Diego 12, Calif.—Ed.

### Wrong Number

Sir:  
On p. 110 of your Mar. 27 issue you list a number of reference patents referring to a gas flaxing process.

One of the U. S. patents listed is 361,695 of which we obtained a copy. This happens to show a washing machine construction. Is this a foreign patent number or should the number have been 2,361,695?

J. D. NESBITT

Surface Combustion Corp.  
Toledo

The patent number 361,695 was given to us in error, which is the patent application serial number. The actual patent number granted against this application is 2,323,666.—Ed.

### Arcair Torch

Sir:  
The item on the Arcair torch for cutting, appearing on p. 134 of your Feb. 14 issue, was of much interest to us.

We wrote to a subsidiary of the National Supply Co. (Billoo Corp., Chicago) and did not receive any reply.

I will appreciate anything you can do to put us in touch with the proper people in this case.

C. F. PASCOE  
Director, Research & Development  
Canadian Car & Foundry Co., Ltd.  
Montreal

While the torch was developed on the West Coast, we think you can get an answer if you will write to the main office of National Supply Co., Grant Bldg., Pittsburgh 30, Pa.—Ed.

### Caustic Etch

Sir:  
On p. 49 of your Mar. 20 issue mention was made of a new caustic etching product that reduces the formation of sludge and scale.

We would be interested in any descriptive literature on this product.

D. R. UNDERWOOD  
Asst. to Plant Mgr.  
Forging Div.  
Kaiser Aluminum & Chemical Corp.  
Newark, Ohio

A detailed article on this item appeared on p. 138 of our Apr. 3 issue entitled "Caustic Etch Treats Aluminum Without Sludge Or Scale."—Ed.

### Machine Tools

Sir:  
We will greatly appreciate it if you will send us six tear sheets of the article "Why Bullard Lathes Were Held Up," by G. Elwers which appeared in your Feb. 7 issue.

F. MAROSI  
Hoern & Dilts, Inc.  
Saginaw, Mich.



### New DOUBLE PURPOSE PRESS

Now you can punch holes of various shapes as large as 4" diameter in 16 gauge steel—also blank, draw, emboss, form—all with the new DI-ACRO Punch. It is ideal for both experimental and production work.

The precision ground triangular ram of this double purpose press prevents punch head from turning, assuring perfect alignment at all times.

A Turret Stripper of exclusive DI-ACRO design automatically strips material from punches of all shapes. Roller Bearing cam action develops 4-ton pressure with minimum effort. Adjustable gauges assure exact location of holes.

### Send For 40-Page Catalog

giving full details on all DI-ACRO  
Hydra-Power Bonders, Power Shears,  
Brakes, Rod Parters, Rollers, Notchers,  
Punches—also our offer of free  
DI-ACRO Engineering Service.

DI-ACRO  
PRECISION MACHINES  
DIE-LESS Duplicating

MAIL  
COUPON  
TODAY



O'NEIL-IRWIN MFG. CO.

302 Eighth Avenue, Lake City, Minn.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

# Short-End Scrap

**Eliminated**

**with Asarcon 773 Bearing Bronze**

When you specify Asarcon 773 (SAE 660) bronze bearing stock you get exactly the length you need for your job . . . *there are no short scrap ends!*

Asarcon 773 bearing bronze is continuous-cast in  $\frac{1}{2}$ " to 5" diameters, cored or solid. 216 standard sizes in lengths of 105" stocked by distributors throughout the country will be cut *long or short* to suit your requirements precisely.

With Continuous-Cast Asarcon 773 there are virtually no rejects because there are no dirt or dross inclusions . . . no blowholes or porosity. Quality is so high that every part passes the most rigid inspection.

Round or symmetrically shaped bars and tubes, special alloys, and longer lengths can be made to your specifications.

*Send for the FREE catalog on Asarco Continuous-Cast Bronzes. It contains physical properties, table of weights, photomicrographs, table of stock shapes and sizes and other valuable data.*

## HOW 11" OF SCRAP ALMOST SCRAPPED THIS JOB



West Coast Sales Agent:  
KINGWELL BROS. LTD., 444 Natoma Street, San Francisco, Calif.

American Smelting and Refining Company

OFFICES: Perth Amboy Plant, Barber, New Jersey  
Whiting, Indiana



# Fatigue Cracks

by Charles T. Post

## Impact

Sometimes the impact on industry and the nation of articles appearing in your f.f.j. is enough to make the most cocksure editor weigh his words carefully.

Take Grant Carr's brilliant articles on alcoholism in industry, which appeared in the Feb. 21 and Mar. 27 issues. Favorable comment from readers was immediate, and you could tell they were going to take action. Then, on Apr. 24, we picked up the newspaper to find a headline:

### WHISKEY PRICES CRACK UNDER STRAIN OF BIG STOCKS AND SLOW SALES

It was perfectly apparent that whiskey drinkers in the metalworking industry went on the wagon immediately after reading Carr's articles. And because metalworking men account for such a big proportion of the total sales of almost any commodity, the whiskey market went into an immediate tailspin.

When the sobering realization of what our f.f.j. had done to a major American industry hit us, we were so shaken that we had to hurry right down to the bar for a double.

## Wiskee

It's not often that we have to take to task our good contemporary, the *Wall Street Journal*, on the matter of accuracy, but we can see it doesn't know much about bourbon.

The W.S.J. the other day devoted its principal article to the bad times that have overtaken the domestic liquor industry. Not only did it fail to recognize the connection with Carr's articles, but it repeatedly referred to bourbon and blended rye as "whisky." As we understand it, the Federal government insists that domestic distillers spell their product with an "e"—whiskey. If you leave out the "e," you are talking about Scotch, and of course there is no such thing as domestic Scotch whisky. Next Christmas, when somebody gives us a bottle, we'll check up on it.

## Hot Box

Tom Rohan, who is spending all his time these days as your f.f.j.'s West Coast editor-in-chief, stopped off in Chicago on his way West. A pal of his told him the

blast furnaces in the Gary area are so hard up for ore that they are shipping it by rail from Gogebic. Small ore cars, generally used for short hauls from pit to dock, are being used. Diesels provide the motive power, running at high speed for best efficiency.

Under this unusual strain, bearings on the small cars frequently go out, causing hot boxes and stopping the trains.

Tom's friend, who lives on a farm alongside the Soo line, tells him at least two or three trains a week are stopped near his home. The trainmen's curses make the pastures blue for miles around. This year's crop, he thinks, will be blue grass for purple cows.

## Puzzlers

The answer to last week's puzzler, according to F. M. Nelson who sent it in, is 11.2827 ft for the height that the ladder would reach. Mr. Nelson has also sent in one of the few correct answers to the cone problem of several weeks ago.

Answers to the land division problem have been flooding in. Most took the easy way out and sold a square from the center but technically they are all correct. So far we have heard from J. J. Manderscheid, Jr., The Manderscheid Co.; F. Woodland, American Telephone & Telegraph Co.; E. A. Schwab, Emerson Radio & Phonograph Co.; E. G. Nyberg, Hamilton Mfg. Co.; A. M. Scott, Ole K. Olsen Co.; S. Englander, Ardell Razor Blade Corp.; R. W. Huff, Canton, Ohio; J. K. Thompson, Gary, Ind.; R. W. Shank, International Harvester Co.; J. Rose, Iron Products Co.; J. Thoreton, G. A. Small Co.; R. W. Aldenderfer, Automotive Materials Corp.; E. Buschaw, Surface Combustion Corp.; E. T. Brace, R. D. Werner Co., Inc.; C. D. Bowman, The Roberts Brass Mfg. Co.; E. Murphy, A. & J. M. Anderson Mfg. Co.; H. R. Mail, Ideal Wrapping Mach. Co., and W. A. Makely, Ravenna Iron Co.

P. A. Ryan, Linde Air Products Co., says that if this problem doesn't confuse everybody, his solution is almost certain to. What is the 4-digit number which you can multiply by four, by the simple expedient of rewriting the same four digits in reverse order? There are no zeros.



at **PELRON**

Here is the way it works. Let us have a talk with you about your industrial oil requirements. Then, on the basis of that discussion, we will recommend an oil for the job you want done better, faster, and more economically. Then you make a trial of our oil on your machines. If the results are what you demand, we're both happy.

If not, however, our laboratory men will work with your problem—formulating, blending, testing until they finally develop the right oil for the job.

You may ask who's going to pay for this work. The answer is that Pelron will, until we develop a solution to your problem. Then you only pay for each drum of oil made to the formula developed to do your work better.

Call us in today. Let us prove how our service can help you!

**PELRON**  
CORPORATION  
INDUSTRIAL OILS AND CHEMICALS  
FOR BETTER PRODUCTION AT LOWER COST

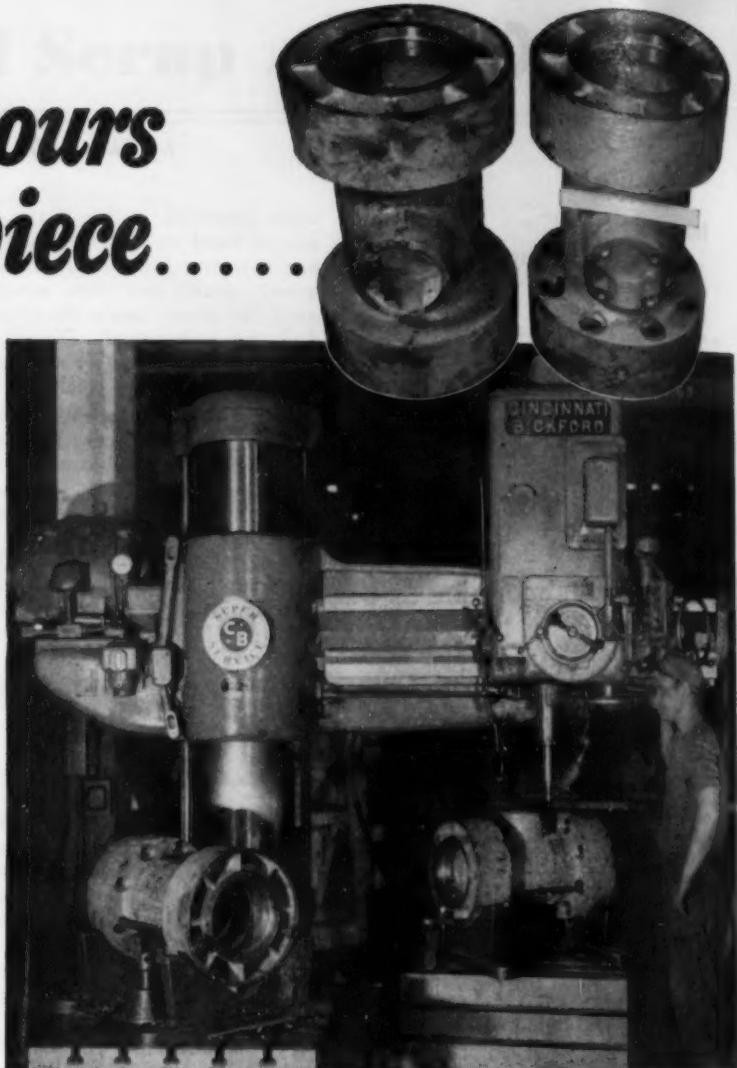
7740 W. 47th Street • Lyons, Illinois

# *saving 2½ hours per piece.....*

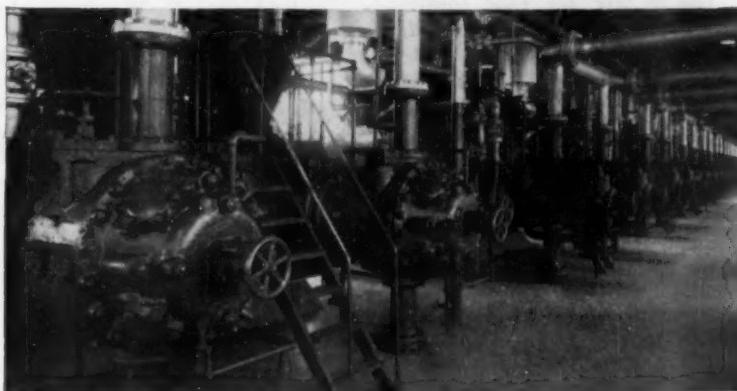
Profitable experience brings satisfaction—and so you find 33 Cincinnati Bickford Drills of all types at the Grove City plant and 20 at the Mt. Vernon plant of The Cooper-Bessemer Corporation.

In the steel compressor bodies shown, and in the front and rear heads which involve similar drilling operations,  $1\frac{3}{8}''$ ,  $2\frac{3}{32}''$ , and  $2\frac{9}{16}''$  holes are bored with a time saving over a previous machine of  $2\frac{1}{2}$  hours, floor to floor per unit.

Handling time was much reduced, and the outstanding convenience and ease of control, combined with steady, accurate performance and dependability, effect these marked operating savings.



*One of the battery of Cincinnati Bickford Super Service Radial Drills at work on compressor cylinder bodies.*



*Ten Cooper-Bessemer Type GMV six-cylinder gas engines of The Cooper-Bessemer Corporation at work in a large Canadian oil company plant. A Cincinnati Bickford Super Service Radial worked on these compressor cylinders.*

**CINCINNATI  
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

**THE CINCINNATI BICKFORD TOOL CO.**

Cincinnati 9, Ohio U.S.A.

## THE IRON AGE Newsfront

- Back of Red China's bacteriological warfare propaganda is inability to cope with public health problems because foreign doctors have left the country and most of the Chinese physicians who haven't escaped have been arrested as counter-revolutionaries. Moscow will probably change this and restore physicians to important status as soon as arrangements can be completed.
- A large midwestern foundry has found silicone-insulated motors pay off on swing grinders. Their higher cost is more than balanced by their better heat resistance, which enables the grinders to be worked harder and longer for increased production.
- Small stamping shops are interested in a new press-substitute a tenth the size of an equivalent conventional press. It forms shallow sheet metal parts (hot or cold) somewhat like standard hydraulic presses now do the job with a solid rubber pad and a forming block. There is no ram, no moving platen. Instead, hydraulic pressure at 5000 psi forces sheet metal (up to 1/4-in. thick in aluminum) around a form block.
- Fourth quarter model changes predicted for two of the big three auto companies threaten to soften the automotive steel market late this year. The auto companies, biggest consumers of sheets, want to build more cars in the third quarter, then cut back in the closing months.
- A huge transfer machine in a defense plant handles a 4-ton workpiece. The work is moved from station to station on a self-propelled flatcar. About 65 tons of metal are removed in the 150-ft long machine.
- Rebuilding of worn aircraft reciprocating engine cylinder liners by means of chromium plating was a big contributing factor in the success of the Berlin airlift. A production plating plant for this purpose is now operating at Kelly Field for the Air Force.
- The development of a successful production method for coating fabricated steel products and gray iron castings with aluminum is expected to make a substantial change in many products designed to resist corrosion and moderate temperatures.
- At least one new company is seriously considering use of the Krupp Renn direct reduction process for reducing low grade ore from the Tennessee Valley. Ore runs anywhere from 25 to 45 pct Fe.
- Compression-sized tubing machines are becoming more and more versatile. It looks now as if they will be used to shape aircraft propeller blades in a single pass from alloy steel tubing. Finished (except for machining) piece will have typical cylindrical root on one side and regular elliptical or airfoil shape on the other.
- Some 2000 miles of aluminum foil (4.5 tons) form the electrodes in a 20,000-kva capacitor installed in a Shawinigan Water & Power Co. plant in Quebec.
- Turkey will build a new ferrochrome plant . . . A new steel plant (40,000 tons of bars per year) is expected to start soon in the Philippines . . . Emerald Mine, British Columbia, has tripled tungsten production to about 650 tons per year.



CMP  
THINSTEEL

## BATS 1000 IN SPRING TRYOUTS

(and Production RUNS)

There are no CLOSE PLAYS when using CMP SPRING STEEL. You can count on a wide margin of safety with CMP annealed or hardened and tempered grades, in a wide range of physicals, sizes, and finishes. When you put this precision material to test you will find you can place your confidence in the end product results—coil after coil, even where requirements are most unusual. Try a test run! Your inquiry will receive prompt and interested attention.

**NOW IS THE TIME  
FOR  
SPRING TRY-OUT!**

(of any of these CMP "regulars")

CMP Spring Steel—Annealed, for best response to heat treatment.  
Hard Rolled or Intermediate Temps.  
Hardened and Tempered, Scaleless Blue Finish.  
Tempered and Polished.  
Tempered, Polished and Colored.  
CMP Tempered Specialties: Feeler Gauge Stock, Vibrator Reeds, Camera Main Spring Steel, Sinker, Tape and Band Saw Steel.



**the Cold Metal Products co.**

YOUNGSTOWN I, OHIO

New York • Chicago • Indianapolis • Detroit • St. Louis • Los Angeles • Cleveland

LOW CARBON, HIGH CARBON (Annealed or Tempered) STAINLESS AND ALLOY GRADES, ELECTRO ZINC COATED ARE AVAILABLE FROM:  
THE COLD METAL PRODUCTS CO. of CALIFORNIA, 6600 McKinley Avenue, Los Angeles

Phone: Pleasant 3-1291

THE KENILWORTH STEEL CO., 750 Boulevard, Kenilworth, New Jersey  
Phones: N. Y., Cortlandt 7-2427; N. J., Unionville 2-6900

PRECISION STEEL WAREHOUSE, INC., 4425 W. Kinzie, Chicago • Phone: Columbus 1-2700



## FLOOD: Midwest Industry Battles Swollen Mississippi

Citizens of Winona, Minn. wage typical fight behind dikes to save their community . . . The town wins out—By K. M. Bennett.

The swollen Mississippi and Missouri Rivers pushed southward to the Gulf, puncturing or overflowing dikes, river banks, and numberless sand bags. The Mississippi moved out in a flood that was the biggest since 1881. For residents and industry of inundated areas it meant wreckage, tragedy, and struggle to hold back the floodtides.

The 24,000 citizens of midwestern Winona, Minn., waited behind their dikes for the overwhelming push of millions of tons of water. They supplemented the bulwark of dikes with action that would minimize destruction.

What follows could be the flood story of any river town:

Friday, Apr. 11.—The City Council met at noon. They had learned the day before that the river

might rise 16.5 ft—and at 13 ft the river is in flood stage. City Engineer Bill Cribbs was chosen to head the defense. His office in City Hall became headquarters.

He directed crews of men to survey the dikes for low spots, directed the build-up of weak areas, and located pumps and emergency equipment Winona knew it would need.

Archer-Daniels Co., at the West end of Winona where a smashed dike had flooded the city last year, put many of its flax decortication crew on flood duty. They built up the West end dike. Peerless Chain

Co. bricked up its ground floor windows. Similar preparations were undertaken by other Winona industries concentrated along Front St., skirting the Mississippi shore line.

Saturday, Apr. 12—The river was now boiling over the edge of Winona's freight yards. Down at the water's edge at Front St., owner G. T. Hall watched his cupola crew pour the last melt from the Badger Foundry's 9-ton capacity cupola furnace. Water streamed beneath the street doors of the furnace room. They abandoned the furnace room, blocked its inner doors with sandbags. Using 900 sand bags as emergency dikes, they saved the interior of the 75-man foundry.

Upstream, city crews reinforced Prairie Island dike

OUT OF ACTION: Stranded work train stands in flooded freight yards. Other tracks on higher ground remained passable, keeping city accessible.



## Special Report



Front St., nearest the river and city's industrial center. Railroad tracks which line the street are hidden by the swollen river waters. The "street" is a rail spur for Winona industry.



Truck is on way to pick up shipments from Peerless Chain Co., which kept operating during the flood. Below, power station of Mississippi Valley Public Service Co. stayed running, although accessible only by boat. Drinking water also held up.



to protect the municipal airport and the city's West end. Some railyards and switch lines along Front St. were closed by the rising water. Steam engines still removed warehoused goods.

The command post at City Hall was told that the water was coming through at the West end of the city. An abandoned sewer was permitting the river to pour beneath the Northwestern Railway right-of-way. An emergency dike 12 ft high was bulldozed up and the first break was sealed off.

**Sunday, Apr. 13**—Word came that the flood peak may reach 18 ft. Winona had to fight through the night. Archer-Daniels Co. is forced to halt production. Mississippi Valley Public Service Co. worked a 20-man crew through the night, bricking windows. Within hours the men were 200 yards from dry land and commuted to the plant by rowboat. But the power kept coming.

Local Red Cross and Salvation Army units brought coffee and sandwiches to dike workers. Snow fell and a freezing slush hampered emergency work. At City Hall, Bill Cribbs learned that the Prairie Island dike, on his far West flank, has gone out and the airport was flooding.

**Monday, Apr. 14**—Two 12-hr shifts of men manned the dikes, with sometimes 200 men on a shift. Front St., the industrial line, was completely awash with water creeping up its side streets toward the retail section. Badger Foundry and its next door neighbor, Winona Boiler Co., were put out of action. But the International Harvester agency was holding out.

At the middle of the line, Peerless Chain (2000 employees) had two-thirds of its brick factory hemmed in by water, but continued normal operations. It planned to truck in 50 pct of needed raw materials and draw the rest from stock. A line of sandbags was built across the face of the three Peerless buildings to keep the force of the water from tearing at the foundations and minimize reconstruction work later.

**Tuesday, Apr. 15**—Bay State Milling, east of Peerless, on the right flank of flood defenses, was awash. Bay State employees emptied out warehouse grain bags into railroad cars. Vice-President M. A. Laberee, watching the flood from his office window, ordered moving of electric hoist equipment from the ground floors of the main mill. Across the street, a lumber company was flooded. Its lumber was boarded into sheds.

At the East end of the industrial line along the river, Mississippi Valley Public Service stood isolated in 4 ft of water. The power house windows had been bricked in time. The power plant stayed in operation, though flood water poured around the transformers outside the building.

A special basement floor designed to withstand enormous water pressure held up. Last year 500 tons of coal

were  
oved  
water  
ban-  
the  
dike  
was  
  
may  
ight.  
ssis-  
rew  
the  
the  
ught  
nd a  
Hall,  
his  
was  
  
d the  
the  
eep-  
dger  
Co.,  
ster  
  
em-  
d in  
ined  
y the  
the  
ce of  
mize  
  
'eer-  
wash.  
bags  
atching  
g of  
was  
  
iver,  
4 ft  
picked  
ough  
the  
enor-  
coal

went in the basement to hold the floor down. This year an added 18 in. of reinforced concrete tied to concrete pilings beneath the building did the job. A huge coal pile was diked around the building to break the force of the river current.

A grim indicator of trouble, the first National Guard amphibious truck arrived, and waddled into position at the West central area of the city. Now Lake Winona, between the city and the mainland, began to rise and water had to be pumped from the lake into the river to checkmate that threat.

The river was above the level of the lake, kept out by dikes on the East and West. If the lake reached river level, one third of Winona would be flooded while the rest became an island.

Winonans stayed calm. They'd been through floods before. And so a good share of the town's normal life continued.

**Outside Help**—Northwestern Railroad sent its division engineer to aid in checking dike levels. The City of Rochester sent over an engineering crew, as did the state highway department. The local state-federal employment service office became a recruiting center for dike workers. Winona's radio station, KWNO, transmitted emergency messages and was ready to sound a general alarm if the dikes needed sudden help.

Some of the engineers and their assistants spent as much as 27 continuous hours on the job. But there was no panic. The business men pumped their basements, still sold goods. The Winona Republican-Herald assigned a reporter to handle the flood story. There were even a few sightseers appearing on the scene, the first trickles of a crowd that eventually jammed the bridge across the Mississippi at Winona.

**Danger's Over**—Winona fought until Monday, Apr. 21. Then word came that the peak had passed. The Mississippi had fallen a fraction of an inch. Not much, but enough to indicate that the greatest danger was past. Now if the dikes hold against wave action, Winona can relax its guard.

They've hung about 4800 ft of plastic curtain, purchased from a local industry, across the face of the dikes. The curtain should break the force of the waves and keep the dikes from crumbling.

City Council decided that they did not need any more daily emergency sessions. Archer-Daniels, Badger Foundry, and Bay State Milling counted up the odds and figure they'll be back into production in about a week, if the river falls rapidly enough to clear the Front Street railroad switches in that time.

Winona, and Front Street, tough and resilient and typically midwestern, are back in business.



Leo Eichman, Badger Foundry employee, and Elzie Turner, of Chicago & Northwestern Ry. car shop, stand on emergency dike above road's right-of-way which was city's regular dike.



Above, Carroll Syverson, plant manager at Archer-Daniels flax decortication plant, surveys flooded property between rear of plant and dike. Stack of "straw" is 500 tons of raw flax fiber. Below, a water pump clears out factory basement on Front St. Main channel of river is in background. Normally 2 miles wide, the Mississippi swelled to 6 miles near here.



## STEEL: Will Competition Cut Prices?

**Competitive scramble for business seen pushing mills to cost cutting drives . . . May have to reach out for business, absorb freight . . . Some prices may be trimmed**—By J. B. Delaney.

A return to a competitive market in steel may touch off one of the bitterest scrambles for business in the history of the industry.

This is a point largely overlooked in the tussle over how much of a price increase the producers will receive to offset higher wages for the steelworkers.

The producers themselves have not overlooked it. They know what's in store. They are looking at already-high "break-even" points, a decline in net income pct of sales, higher debt, higher fixed costs—and they're worrying.

The mills already are trimming their sails. Economy drives are widespread. No bets, however small, are being overlooked. For example, the April issue of *Men and Steel*, slick-paper employee publication of Jones & Laughlin Steel Corp., carried a notice that succeeding issues will be in less expensive format, will have fewer pages. The reason: ". . . vital need to effect economies throughout the company."

**Absorbing Freight**—Steel executives know that in a softer market they will have to sharpen pencils to capture business outside their "normal" marketing area. If competition really gets tough they will trim selling prices—both base prices and extra charges for special operations. First, though, they will in effect reduce prices by paying part of shipping costs to meet competition.

Some mills, particularly Pittsburgh district producers at a disadvantage from a rail freight standpoint with mills closer to large consuming areas, will increase water shipments to take advantage of lower transportation charges. (THE IRON AGE, Nov. 1, 1951, p. 71.)

This is why two of the biggest problems confronting steel man-

agement today are costs and quality. It is shaving costs and striving to improve quality. This is the preliminary planning.

**Low Costs, Long Reach**—The producers are emphasizing cost-reduction because costs determine how far they can reach out for business before getting to the point where it is better to curtail or shut down a mill unit. Quality is important because as the market becomes more competitive customers grow more particular. Rejections increase—and rejections are expensive.

Steel producers will be under great pressure to continue operating in a competitive market. Higher fixed costs tend to increase the pressure. Many of them have installed new, costly equipment. They won't let it stand idle if they can help it. The older, least efficient plants will be first to shut down. Some may even be abandoned.

The mills have no hard-and-fast rules on "price absorption"—that is, how much of the shipping cost they will pay to get business. This will vary product-by-product and mill-to-mill.

For instance, a Pittsburgh mill



might be willing to shave its net return on cold-finished bars \$7 to \$10 per ton to meet competition in the Chicago area. But it wouldn't go beyond \$1.50 to \$2 per ton on carbon sheets and strip. The reason is that there's much more of a price leeway possible on cold-finished bars.

**More on Wide Sheets**—Extrawide carbon sheets are more lucrative, so the "price absorption" on this product would be higher than on narrower sheets. Some mills would absorb up to \$7 per ton on high strength low alloy sheets, \$7 on alloy plates. But on hot-rolled bars, carbon plates, and some wire products they might not be interested in absorbing anything.

Producers are giving plenty of thought to prices. Under the rules they must post a mill price. They may shave the price to meet actual competition. But no one has come up with a firm answer yet on defining the terms of competition.

The mills are asking whether a price quotation from a competitor to a customer is necessary, or whether a customer's word that he received a lower bid from another producer is sufficient. Under certain circumstances, some producers believe, delivered prices can be quoted.

### Research for War Contracting

Industrial research and development capacity, and the effect of military demands on this capacity, are being explored through a mail survey conducted by the Research and Development Board, Defense Dept.

Some 5000 companies are expected to furnish data which R & D believes will be useful in defense contracting. Part of the information requested deals with average expenditure per research engineer and average percentage of sales income spent for research.

Using these figures, the Board will estimate manpower needs in performing research programs and the amount of research, dollar-wise, which can be handled by staffs of a given size.

## PRICES: Steel Won't Bite on Rise

**OPS is offering \$3 per ton increase on steel . . . But industry won't be maneuvered into accepting it . . . It's a far cry from \$12 needed to offset suggested wage hike—By W. V. Packard.**

Steel companies will not bite on the \$3 price bait the government is dangling in the hope of landing a 26¢ per hr (30¢ by industry figures) wage increase for steelworkers. The reason is obvious: Granting the full wage increase recommended by Wage Stabilization Board would cost steel firms \$12 a ton, or four times the amount the government is using for bait. Steel people will continue to insist that they can't afford that kind of "bargain."

The \$2.84 to \$3 per ton price "relief" comes in the form of cost-price adjustments under the Capehart amendment to the Defense Production Act. It covers higher costs between Korea and last July 26. The industry is entitled to it under the law. It has nothing to do with price relief to offset any wage increase to be granted.

OPS Director Ellis Arnall was instructed to issue the price order by Roger L. Putnam, Administrator, Economic Stabilization Agency. It is called Supplementary Regulation 100 to General Ceiling Price Regulation. It permits steel producers to apply for price increases of 2.6 pct. OPS estimates this would allow an increase of \$2.84 per ton on carbon steel, or an average of \$3 per ton if all types are included.

**Why Change Now?**—Normally, industries eligible for price adjustments under the Capehart amendment take the initiative in asking Office of Price Stabilization to issue a specific price regulation. But in this case the steel industry has refrained from seeking Capehart adjustments. Steel people felt that by accepting such increases they would weaken their case for higher prices to offset higher wages recommended by WSB. Washington officials and Union Chief Phil Murray would

be quick to capitalize on this. In the public mind the industry would have had its price relief.

An OPS regulation authorizing Capehart adjustments means that the Administration is willing to go to unusual means—foisting an inadequate price increase on the industry—in order to force a big wage package down its throat.

**On and Off**—It is known that at one time the government was prepared to offer a price increase of more than \$3 a ton—possibly \$4.50 a ton. This was withdrawn. A total price rise of \$5 to \$5.50 a ton may finally be granted to partly offset the wage package.

Though President Truman will continue to force the issue through his "stabilization" officials, the steel industry will drag its feet on accepting a price increase it is convinced is inadequate.

**Legal Maze**—It has been suggested that Commerce Secretary Sawyer might put the price increases into effect, since he tech-

nically operates the steel companies as a result of President Truman's seizure order. This is to be doubted. Such a move would compound legal actions which companies are already bringing against the government.

Major steel companies already have a suit before Federal District Judge David A. Pine to prevent Mr. Sawyer from raising steel wages during seizure. Judge Pine said he considered the main issue to be whether the President has authority to act in emergency outside of specific statutes.

When Assistant Attorney General Holmes Baldridge (acting as Mr. Sawyer's attorney), asked a week's delay to prepare a brief on the constitutional question, Judge Pine refused—unless Mr. Baldridge would agree that the status quo on wages would be maintained. He said he couldn't agree. The judge reminded him he was there as Mr. Sawyer's attorney. Then he said he would consider the case to the exclusion of everything else—unless there was agreement to maintain the status quo on wages in the industry.

**Negotiations**—In New York last week Eugene Grace, chairman, Bethlehem Steel, said the best wage offer the companies have made was for 12½¢ plus fringe. The package would have cost the companies 20¢ per hr. He said it would take an \$8 a ton price rise to cover the cost, just as it would take \$12 a ton to cover the full 30¢ WSB package. But he emphasized that the industry is not demanding such a price rise.

In Washington, Clarence B. Randall, president, Inland Steel, said the industry should demand a \$5.50 price hike if the steelworkers get 17½¢ per hr wage and fringe boost. He, too, said the WSB package would cost the industry \$12 a ton, but that it is not demanding such an increase. Mr. Randall's \$5.50 figure was the first public hint by a steel company official as to what the industry has been discussing in closed negotiations.



"Just what does he do around here?"

## BRIGHTWORK: Cars Try Substitutes

Automakers come up with new ways to beat defense casualties . . . Nickel is in worst shortage . . . Special clear lacquers developed as substitutes for it—By W. G. Patton.

Brightwork on 1952 cars isn't what it used to be in pre-Korean days. But the customer himself may be largely responsible if corrosion resistance is too far below the protection in early postwar cars.

Automobile plating specifications have necessarily changed because of defense needs for alloys. All of the plating changes have been made at the insistence of Washington. Engineering research and plating experts have been working for several years now trying to find a satisfactory substitute for the protective nickel plating once specified on all passenger cars. Success to date has been encouraging but limited.

Most auto engineers will tell you frankly they don't like the new brightwork as well as the old. Many of their objections center around difficulties in applying the new lacquers. Protection against corrosion, they say, is close to former methods — provided the customer does not remove the lacquer in his zeal to have a car that will outshine any other vehicle on the block.

**Little Change**—Generally speaking, plating specifications for bumpers, bumper guards and door handles have not changed too much although plating specification calls for reduced copper and nickel. The basic problem here is to obtain enough nickel to meet specifications. Normally, a typical bumper of a low-priced car will have a total plating protection of 0.0015 in. including 0.0005 Ni and 0.00001 Cr.

The Cr plating is added primarily to give color, brightness and resistance to abrasion. The underlying nickel stops corrosion in the microscopic cracks that are characteristic of thin chromium plate.

As soon as nickel became a war casualty, car makers began turning out a number of decorative products that were chromium-plated over copper or directly over steel or zinc alloys.

In the early days, brightwork often looked as good as ever when new, but failed early in service. Now auto plants are using clear, organic coatings to fill the microscopic cracks in the chromium plate. Special clear lacquers had to be developed for this purpose.

**Glass-Like**—New lacquers provide a smooth, glass-like surface. Some are dipped and others are sprayed. Most lacquers are baked at about 200°F. According to producers of the new enamels or lacquers—and there are many of them—even after the wear-resistant enamels are worn off the

surface, there remains considerable protection against the effects of corrosion.

Lacquer is not used on bumpers. It is applied to parts like grilles, name plates, brackets, hub caps, tail light brackets. Most car producers advise car owners not to use harsh polishes, particularly on these parts.

Most plating problems in today's new cars are associated with parts on the rear of the car where dust thrown up by the car and other service conditions seem to present a more difficult and critical problem.

Although so-called "white brass" has been talked about, it is not yet generally accepted by the industry.

**Uniformity**—Manufacturing difficulties in the use of lacquers are primarily problems arising from the difficulty of obtaining uniform coverage. Where sharp edges are adjacent to flat surfaces it is, of course, difficult to keep the protective coating uniform. Also, it is not a simple matter to spray lacquers on an irregular shape and obtain uniform coverage.

Auto firms are learning every day to use the new materials but most would return to earlier methods if the necessary plating materials were available.

There seems to be agreement, however, that if the protective film of lacquer remains intact and if it is uniformly applied, the car owner is still getting brightwork that will stand up fairly well under most driving conditions. All car makers are advising the car owner to wash his car frequently. Some suggest the use of oil coating or other protective films on plated parts.

Trim, incidentally, is relatively unchanged except that chromium-type stainless has been substituted 100 pct for nickel-chrome stainless. Some grilles are being made of stainless to provide maximum protection without using nickel. Buick uses a thin stainless shell on its combined bumper-grilles.



LONG LIFE: Solar Aircraft Co., San Diego, is testing ceramic coatings on stainless steel burner chambers for petroleum refining. Coatings are expected to extend life of the units by 2 to 4 years.

## ENAMELING: New Process Cuts Costs

**One-coat method promises big savings, lower prices . . .  
Enamel is applied direct to metal, with no ground coat needed  
. . . Non-premium steel can be used —By E. C. Beaudet.**

A new process for applying one coat of porcelain enamel directly to non-premium steel now being tested in appliance plants throughout the country promises to be one of the longest steps forward taken by the enameling industry in recent years.

Called the Ferro-Republic process, the new method eliminates need for a ground coat. Considerable savings for enamelters are thus achieved with an increase in firing furnaces capacity.

**Lower Cost**—Developed jointly by Ferro Enamel Corp. and Republic Steel Corp. of Cleveland the enameling technique has been commercially used by Baltimore Porcelain Steels, Inc., for the enameling of wall tiles during the past year and a half. Since the line at Baltimore was designed especially for the Ferro-Republic process, no direct cost comparisons can be made. However, pilot operations in appliance plants indicate it will materially reduce enameling costs and make it more competitive with other types of finishes.

Process, which has been patented since the first of the year, will be made available to enamelters under license arrangements when it is ready for wide distribution by the developing firms.

Among the companies now testing the process is the Heintz Mfg. Co., Philadelphia, which has set up a pilot operation for the enameling of automatic washing machine tubs and tops. General Electric at Erie, Pa., and Hotpoint, Inc., Chicago, have established pilot operations for production parts such as stove parts, refrigerator liners and door panels. Westinghouse and Frigidaire are also investigating.

**Metal Treating**—Process can be used on enameling iron and many cold rolled steels without special

enamel compositions or mill additions, such as molybdenum or antimony compounds. Its success hinges on treatment of the metal prior to enameling. The Ferro-Republic process differs from conventional practice in that a special pickling process using nitric rather than sulfuric acid is used to get a deep etch on the steel. It removes more iron than sulfuric acid and gives a rough surface to the metal.

Second important feature of the process is its method of nickel deposition by chemical reduction rather than galvanic displacement. In ordinary nickel dipping some iron goes into solution when the nickel is deposited. When chemical reduction is used no iron goes into solution. This results in the rough surface necessary to give the steel the required bonding quality. It also enables the steel to take on a more continuous nickel coating.

Progress in the enameling industry has been brought about by continually decreasing coating thickness, giving a more serviceable product. The Ferro-Republic process reduces the enamel coating to 0.004 to 0.005 in. against the 0.008 in. average thicknesses ob-

tained with a ground coat and cover coat.

**Good Quality**—Thinner coating offers greater resistance to heat, impact, thermal shock and torsion. Products enameled by the process are said to have surface, reflectance and color qualities equal to those of conventional porcelain enamel finishes.

Savings equivalent to one-half the cost of the complete ground coat operation are said to be achieved with the process. This, together with greater wearing quality and thinner coatings, will make porcelain enameled coatings more competitive with other types of finishes and permit wider application. Ferro engineers are hoping eventually to put it on the exteriors of automatic washers and refrigerators.

**Competition**—During the early 1930s synthetic resin finishes on refrigerator exteriors replaced porcelain enamel because they could use a lighter gage steel and required no bracing of the structure during firing temperatures of 1500 to 1550°F.

The great difference in cost between the two finishes was due to heavier gage and increased fabrication expense when porcelain enamel was used. Ferro engineers believe lower firing temperature enamels can be developed eventually. These, when coupled with the new 1-coat process will make porcelain enamel competitive with synthetic resins and provide better wearing qualities.



"Washington sent us a few suggestions about operating procedure."

# FREIGHT: DTA Sets New Car Goals

**Agency revises production aims after latest survey of defense needs . . . Three-year program set . . . Industry asks bigger quotas . . . CMP relief promised — By A. K. Rannells.**

High levels of freight car production over the next 3 years are called for by an upward revision of goals resulting from the latest Defense Transport Administration survey.

Carbuilding shops must turn out 438,500 new freight cars for domestic use by July 1, 1955, to hit the new target. This does not include military or export requirements.

Fast tax writeoffs on the new freight car goals have been pledged. Certificates for another 142,000 units may be granted later.

Broken down, the revised production timetable calls for an average 10,000 units a month for the first three quarters of 1952. Then the rate is to be stepped up to 11,000 a month through June, 1954. After this 11,875 a month are called for in the ensuing 12 months ending July 1, 1955.

**Can Do?** — Can this ambitious program be met?

The American Railway Car Institute and Assn. of American Railroads have told DTA that it can "if sufficient materials are made available."

Allocations have been a sore subject. National Production Authority's railroad industry advisory committee has been bitterly critical, feeling that railway needs have been slighted.

"Steel salesmen have been parking on our doorsteps," they complained 2 weeks ago. "Our problem is not being unable to find sources but one of getting CMP tickets giving us authority to place orders."

**Quota Boosts** — This is apparently in the process of being ironed out. Initial third quarter allocations were made on a basis of an output of 25,000 freight cars with

possible supplemental allotments if there is no interruption to steel production.

Substantial increases are promised for the fourth quarter. While no commitments have been made, indications are that allocations will permit a minimum production of 10,000 units. This is the period when the expanded program calls for 11,000 monthly.

**Two Phases** — There are two phases to the revised program. The first calls for a total production of 296,000 new freight cars during the immediate period of Jan. 1, 1952, to July 1, 1954. This segment has been reviewed and approved by Defense Production Administration.

For the second part of the program, DTA says that an additional 142,500 units must be produced during the following 12-month period ending July 1, 1955.

But Defense Production Administration is still studying this one. And DTA plans to conduct regular surveys at 6-month intervals.

**Outdated** — Reason for the upward revision of freight car goals is that the current program of 10,000 units a month—never reached, incidentally—was based on surveys taken immediately after the Korean outbreak.

"These did not provide for increases sufficient to meet demands of full mobilization or an all-out war," DTA Chief Knudson explains. Even current defense production was under-guessed.

New goals are based on survey findings that domestic freight car ownership should total 2,167,000 by July 1954—of which 1,867,000 would be owned by Class I roads. Class I's are themselves committed by an earlier estimate to increasing their ownership to a slightly lower figure of 1,850,000 cars.

The proposed build-up to 2,167,000 cars is likewise based on forecasts which indicate mid-1954 rail freight requirements at 705 billion ton-miles. This represents a 3.5 pct increase over the 1951 level. But it would still fall short of the

*Turn to Page 98*

THE IRON AGE

## IRON & STEEL: March Output By Districts

As Reported to the American Iron & Steel Institute

DISTRICTS	BLAST FURNACE —NET TONS	Number of Companies	PIG IRON		SPIEGEL, FERRO-MANGANESE		TOTAL			
			Annual Capacity	March	Year to Date	March	Year to Date	March	Year to Date	Pct of Capacity
										March
Eastern .....	12	13,983,580	1,168,864	3,418,412	30,411	85,496	1,190,275	3,503,908	101.2	100.8
Pitts.-Yngtn.	17	27,468,600	2,339,542	6,769,217	22,733	78,894	2,362,275	6,847,901	101.5	100.3
Cleve.-Detroit .....	6	7,501,100	611,017	1,750,344	.....	.....	611,017	1,750,344	96.1	93.8
Chicago .....	7	15,703,740	1,316,642	3,734,654	.....	.....	1,316,642	3,734,654	98.9	95.6
Southern .....	8	5,648,620	500,316	1,395,063	5,570	16,833	505,892	1,411,896	105.7	100.5
Western .....	3	3,476,700	304,905	875,496	.....	.....	304,905	875,496	103.5	101.3
Total .....	35	73,782,340	6,241,286	17,943,186	56,720	161,013	6,300,006	18,124,199	100.8	98.8

DISTRICTS	STEEL —NET TONS	Number of Companies	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots)				ALLOY STEEL		CARBON INGOTS	
			Annual Capacity	March	Year to Date	Pct of Capacity	March	Year to Date	March	Year to Date
Eastern .....	23	21,709,870	1,845,803	5,387,511	100.3	99.8	143,049	418,826	386,499	1,113,254
Pitts.-Yngtn.	33	42,350,760	3,842,846	10,557,148	101.5	100.2	507,475	1,518,601	433,132	1,253,424
Cleve.-Detroit .....	8	10,485,380	892,082	2,572,272	100.4	98.7	55,090	172,658	99,765	271,442
Chicago .....	15	22,258,500	1,991,120	5,682,956	105.6	102.7	147,124	444,113	301,011	874,599
Southern .....	10	5,291,260	467,645	1,372,810	104.3	104.3	7,493	22,328	1,555	5,297
Western .....	12	6,491,900	565,095	1,624,721	102.7	100.6	11,070	29,801	44,215	121,299
Total .....	78	108,587,670	9,404,191	27,197,518	102.2	100.7	871,301	2,806,327	1,286,177	3,639,315

*if you do One or More of these Jobs...*



CUT STRAIGHT LINES



CUT RINGS—SMALL OR LARGE



CUT CIRCLES



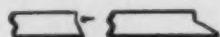
JOGGLE  
AND OFFSET



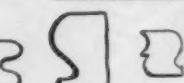
MAKE FLANGES



CUT ODD SHAPES



BEVEL AT ANY ANGLE



CUT REVERSE CURVES



BEAD OR TURN U'S



CUT INSIDE HOLES  
WITHOUT CUTTING IN  
FROM EDGES

*do them faster...*

*with more accuracy...*

*at a lower cost...*

## **with *KLING* ROTARY SHEARS**

Now get hair-line precision as well as speed in all of your sheet and plate cutting. With Kling Rotary Shears, no matter what your shearing requirements, you improve both speed and accuracy. You get accuracy unheard of before in shearing operations. You get speed that will keep pace with today's production demands.

You get this money-saving performance whether you do one or many of the operations shown above. One Kling Shear, because of its versatility, will often eliminate the need of several old style shears or other types of equipment.

Many attachments are available which permit this machine to perform a wide variety of functions. With Kling Shears it is possible to shear almost any shape desired including parts with very small radii, to the right or left.

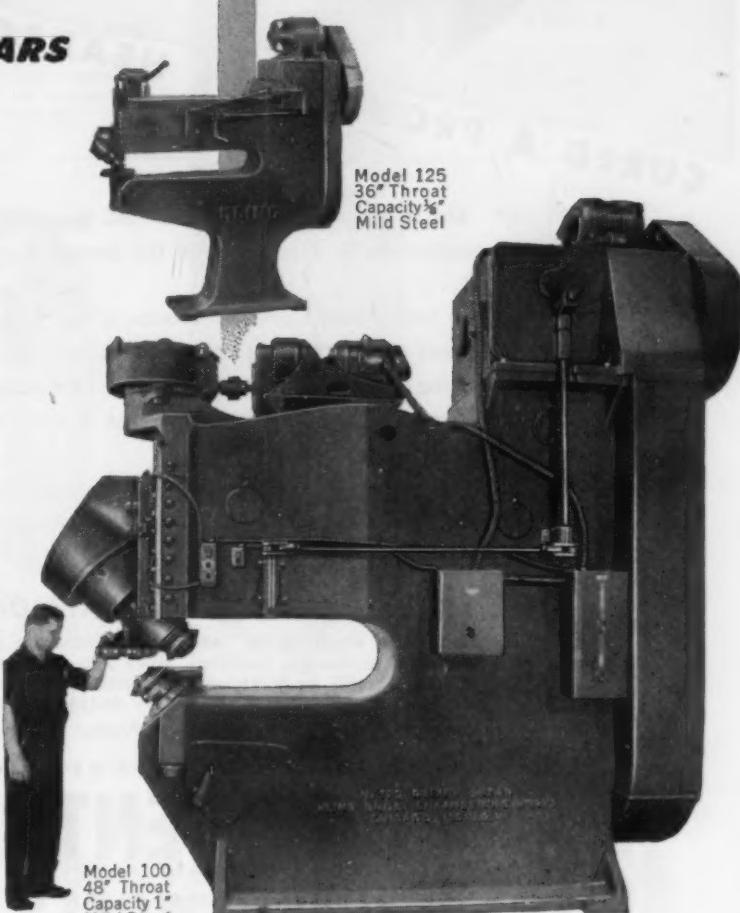
A wide range of types and sizes are available to meet your specific requirements up to a rated capacity to shear 1" thick mild steel.

**get the facts . . .** Find out how this machine will fit your production requirements and save you money. For complete details, instructions, features and specifications of all Kling Rotary Shears, write today for your free copy of Kling Bulletin No. 245A.

**Kling Bros. Engineering Works,**  
1322<sup>nd</sup> N. Kostner Avenue, Chicago 51, Illinois

in our  
60th  
Year

**Kling**



*...an investment in speed!*





The Rubber Heat Pad is patented by  
Lamco Process Company, Erie, Pa.

## CURED A PRODUCTION HEADACHE

This electrically heated rubber pad has reduced the time required for re-soling shoes in the famous Lamac Press by as much as 75%.

Continental made this improvement possible because it was able to develop a rubber compound that withstands the sustained heat generated by the electrical heating element. Continental also solved the equally difficult problem of positioning this heating element so that it would not shift and "short" itself when the pad was molded.

The success of this development is another example of the specialized assistance in rubber which Continental offers to design and production engineers.



### LET US SEND YOU THIS CATALOG

This new engineering catalog lists hundreds of standard grommets, bushings, rings and extruded shapes. It will be a valuable addition to your working file. Send for your copy today or... See our Catalog in Sweet's File for Product Designers

MANUFACTURERS SINCE 1903

# CONTINENTAL RUBBER WORKS

1985 LIBERTY BOULEVARD • ERIE 6, PENNSYLVANIA

### BRANCHES

Baltimore, Md.  
Boston, Mass.  
Buffalo, N. Y.  
Chicago, Ill.  
Cincinnati, Ohio

Cleveland, Ohio  
Dayton, Ohio  
Detroit, Mich.  
Hartford, Conn.  
Indianapolis, Ind.

Kansas City, Mo.  
Los Angeles, Calif.  
Memphis, Tenn.  
New York, N. Y.  
Philadelphia, Pa.

Pittsburgh, Pa.  
Rochester, N. Y.  
St. Louis, Mo.  
San Francisco, Calif.  
Syracuse, N. Y.



### Controls

estimated 850 billion ton-miles needed for "full mobilization."

**More Steel, More Cars**—Expansion of the steel industry has had an important part in the increased forecast of freighting needs.

Steel production is figured for an increase from the 108 million tons capacity of 1951 to a probable 120 million tons by end of 1953.

This means a need for additional gondola cars, for instance. Rolling stock of this type adds up to about 51,000 cars at present. This is 15 pct less than what was available at the end of the war.

**Coal, Ore Needs**—In addition to movement of steel and steel products as such, more cars will be needed for transport of extra coal and ore for higher output.

Coal output last year was reported at 535 million tons. It is estimated at a minimum of 555 million tons for 1952—and considerably more for 1953. Full-scale war production took 620 million tons.

A considerable increase in need for ore cars is also foreseen. Great Lakes shipments during 1951 amounted to 89 million tons. The 1952 forecast is 96 million tons of ore. And as ore import volume rises, more cars must be available for prompt removal from ports to inland points.

### Industry Controls This Week

**Automotive Parts**—Rebuilders of automotive engines and parts are required to establish ceilings under CPR 139.

**CMP**—Amend. Dir. 3, CMP Reg. 1 sets limits on the portion of an allotment which can be ordered for delivery during the last month of any quarter.

**Iron Ore**—Amend. 16, GOR 9 exempts two major classes of iron ore sales between affiliated companies from price controls.

**Experimental Metals**—Amend. 17, GOR 9 exempts experimental ferro-alloys and ferrometals from price controls.

**Orders**—NPA Reg. 7 sets up two classes of orders—published and unpublished.

**Packaging Closures**—Amend. M-26 removes all curbs on aluminum closures.

miles  
,"  
xpan-  
s had

creased

for an  
a tons  
le 120

tional  
Roll-

up to  
This  
avail-

ion to  
prod-  
ill be  
a coal

is re-

It is  
5 mil-

sider-  
e war

tons.  
need

Great  
1951

The  
ons of

volume

available

rts to

ers of

re re-

under

Reg. 1

allot-

or de-

of any

9 ex-

on ore

panies

d. 17,

ferro-

ce con-

up two

nd un-

M-26

minimum

AGE

Rubber—Amend. M-2 removes all controls from natural rubber, except pale and sole crepe.

Services—Amend. 3 and SR 16, CPR 34 provide price relief mechanism for new services.

Stainless Steel—Sched. 3, M-6A limits the amount of nickel-bearing stainless which may be sold to customers without allotments.

Steel—SR 100, GCPR grants Capehart adjustments of 2.6 pct for iron and steel products.

New Products—Dir. 1, M-47B forbids shifting material allotted for new products to other products.

### Latest Government Appointments

Washington has recently announced the following appointments in defense and related agencies:

J. F. Farnam, deputy chief, Wire Mill Branch, Copper Div., NPA;

Earl D. Johnson, in charge of Army procurement and research and development programs;

Paul H. Jordan, deputy assistant administrator for Public Information, NPA;

James F. King, deputy administrator, International Activities and Defense Materials, DPA;

Lawrence W. Strattnar, assistant administrator, Chemical, Rubber & Forest Products Bureau;

Brig. Gen. Thomas B. Wilson, director, Procurement Agency Region 3, London; DMPA;

Walter H. Wiewel, chief adviser to Secretary of Commerce Sawyer for operating seized steel mills.

### Ban New Product Quota Shifting

Material allotments made for manufacture of new products are not subject to the same shifting to some other product as are most goods covered by M-47B.

This denial of flexibility in the case of a new product allotment was made this week in Direction 1 to the order.

When a producer receives an allotment under a new product code, officials said, all production under the code is excepted from flexibility until all material so allotted, both for that and the succeeding quarter, is used. Nor can materials be diverted into that new product code.

# Get 'Em from Your Jobber!

You can be sure your Pyrene\* jobber will recommend the right extinguishers for your fire hazards—because there's a Pyrene for every fire hazard! Standardize on Pyrene, a symbol of quality since 1907.

\*T.M. Reg. U.S. Pat. Off.



CARTRIDGE-OPERATED

New stainless steel shell—new low price. No annual recharging; no acid. For fires in wood, paper, textiles. 2½ gal. size.



VAPORIZING LIQUID

World's best all-purpose extinguisher. Safe on electrical fires, effective on flammable liquid fires. 2 qt., 1 gal. (above) pressure types. 1 qt. (large illustration) and 1½ qt. pump types.



AIR FOAM

Couple playpipe to hose line. Every 19 gals. of water and 1 gal. of Pyrene Foam Compound yield 200 gals. of foam! For flammable liquids and ordinary combustibles.



CHEMICAL FOAM

2½ gal. size produces about 22 gals. of fast-acting foam. Ideal for flammable liquid and ordinary combustible hazards. Seamless copper or stainless steel shell. (Pyrene Soda-Acid also available in stainless steel or seamless copper.)

And other extinguishers. Also manual and automatic fire-fighting systems.

## There's a PYRENE for Every Fire Hazard



PYRENE MANUFACTURING COMPANY

692 Belmont Avenue Newark 8, New Jersey

Affiliated with C-O-Two Fire Equipment Co.

# SHEET METAL FABRICATION by KIRK AND BLUM

## Contract Manufacturing Facilities

Whatever your requirements in sheet, plate and alloy fabrication, Kirk & Blum can produce for you... economically and quickly.

Complete facilities through  $\frac{3}{8}$ " capacity for square and rotary shearing, braking, forming, rolling, punching, riveting, welding, grinding, drilling and finishing sheets and light plates and structurals.

For complete details, write for literature on fabrication facilities and experience or send prints to:

*The Kirk & Blum Mfg. Co.,  
3200 Forrer Street,  
Cincinnati 9, Ohio.*

Tanks • Spare Parts Boxes • Panel Boards  
Machine Bases, Pedestals and Frames  
Hoppers • Electrical Enclosures • Guards  
Panel Boards • Rolled Steel Rings • Racks  
Stampings • Pans • Louvre Panels • Cabinets

**KIRK AND BLUM**  
METAL FABRICATION

### Controls

#### Steel Seconds Curbs to Be Lifted

Controls will be lifted from second-quality carbon steel, effective for the fourth quarter, just as soon as National Production Authority can get around to amending CMP Reg. 1 to make it official.

Meanwhile, users of this type steel will get letters from NPA about the first week in May telling them not to include these items in their statement of requirements. They will also get new CMP 4-B forms.

Officials estimate that controls will thus be removed from about 800,000 tons of steel for the quarter. Second quality is defined by NPA as "any item of rejected or carbon steel shearing or second quality which is usually sold by a producer at a stated lower price than such items of prime steel." About 90 pct comes from flat rolled such as sheet and strip shearings.

Mailed instructions will outline details to be observed in reporting and other changes in the new CMP 4-B.

#### Experimental Metals Decontrolled

Metallurgical producers of experimental ferroalloys and ferrometals may sell their products without price control, Office of Price Stabilization has ruled, so long as sales of any one item do not exceed \$25,000 and sales of a single category of items amount to \$100,000 or less.

OPS defines a material as experimental only when it is the product of research, testing, and sampling done in a laboratory or pilot plant, or both. Because most transactions in such materials involve small lots, the pricing agency decided it was inefficient to continue establishing ceilings for sales producing little effect on mobilization programs.

When a commodity ceases to be experimental or when sales pass the maximum figures named, transactions will be subject to the general ceiling price regulation or an applicable numbered regulation.

## Defense Contracts

### Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

**Aviation Supply Office, Philadelphia.**  
Clamp, 300000 ea, 383/2130-279-51Q, May 8.  
Strap, 35000 ea, 383/2130, May 8.

**Navy Purchasing Office, Washington.**  
Bridle, chain, 960, 6044S-B, May 15.  
Floats, 2120, 6026S-B, May 20.

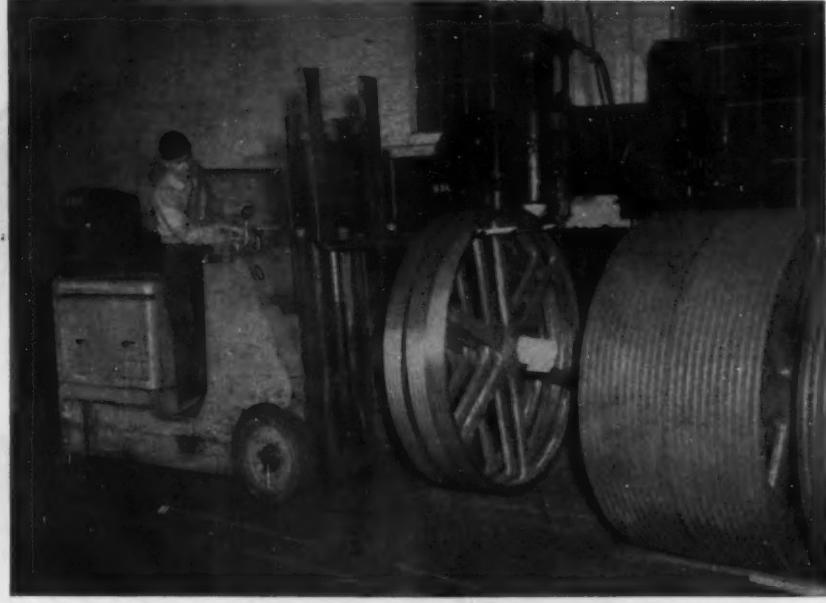
**Signal Corps Supply Agency, Philadelphia.**  
Mounts, FT-172, 8100 ea, 1370-12B, May 8.

**Naval Air Station, Yukon, Fla.**  
Unions, 282, 207-53-52B, May 19.  
Nipples, 564, 207-53-52B, May 19.  
Reducers, 584, 207-53-52B, May 19.  
Nipples, 846, 207-53-52B, May 19.  
Valves, 564, 207-53-52B, May 19.  
Valves, gate, 282, 207-53-52B, May 19.

**Ordnance Tank Automotive Center, Detroit**  
Connector flared tube brass, 10000, 52-3250B, May 16.  
Connector tube compression 27000, 52-3250B, May 16.  
Connector fitting air brake, 60000, 52-325-B, May 16.  
Connector air brake hose, 35000, 52-3250B, May 16.  
Coupling air hose, 200, 52-3250B, May 16.  
Retainer, 250, 52-2888B, May 16.  
Spacer torsion bar suspension, 500, 52-2888B, May 16.  
Shaft main trans., 2000, 52-2808B, May 16.  
Pinion spur diff., 1400, 52-2808B, May 16.  
Shaft, 500, 52-2808B, May 16.  
Shaft gear, 800, 52-2808B, May 16.  
Shaft input, 2500, 52-2808B, May 16.  
Gear set assy, 600, 52-2808B, May 16.  
Gear, 100, 52-2808B, May 16.  
Gear camshaft, 650, 52-2808B, May 16.  
Shaft transfer, 800, 52-2808B, May 16.  
Gear driving, 1800, 52-2808B, May 16.  
Pintle towing, 5400, 52-2791B, May 16.  
Forge, 280, 52-3256B, May 16.  
Charger battery, 4485, 52-3256B, May 16.  
Bushing pipe shoulder M I, 196000, 52-3252B, May 8.

**Watervliet Arsenal, Watervliet, N. Y.**  
Steel plug, for 20 MM gun, 7700 ea, 52-142B, May 14.  
Steel plunger assy for 20 MM gun, 7700 ea, 52-142B, May 14.  
Steel rod, feed for 40 MM gun, 1850 ea approx., 52-121B, May 16.  
Steel pawl, for 40 MM gun, 2500 to 7000 ea, 52-121B, May 16.  
Steel brass, tray, automatic loader assy for 40 MM, 500 ea, 52-157B, May 19.

**Springfield Armory, Springfield, Mass.**  
Pin retaining, 50000 ea, 52-262B, May 6.  
Washer, 15000 ea, 52-262B, May 6.  
Screw, 5000 ea, 52-262B, May 6.  
Rivet cover extractor cam, 166092 ea, 52-259B, May 5.  
Rivet bolt latch bracket, 17000 ea, 52-259B, May 5.  
Pin, 38000 ea, 52-259B, May 5.  
Tool gas cylinder reconditioning, 2500 ea, 52-260B, May 5.  
Tool gas cylinder cleaning cal .30 BAR, 128429 ea, 52-260B, May 5.  
Gage, indicator, assy, 1000 ea, 52-264B, May 7.  
Gage, location, indicator, 200 ea, 52-264B, May 7.  
Reamers 583 ea, 52-265B, May 7.  
End mills, 150, 52-265B, May 7.  
Cutters, spline milling, 245 ea, 52-265B, May 7.  
Cutters, rifling head, 250 ea, 52-265B, May 7.  
Tool combination, 9981 ea, 52-260B, May 5.



## Characteristics That Precisely Fit the Needs

A material-handling industrial truck makes as many as 45 stops and starts per minute—ahead, back, up, down. For operating efficiency, it requires instant power for starting and acceleration but should consume no power during the stops and the preceding coasting and braking intervals.

The kind of power that precisely meets these needs is ELECTRIC POWER supplied by an EDISON Nickel-Iron-Alkaline Storage Battery and applied by a high-torque d-c ELECTRIC MOTOR through instant on-off controls. And the battery-charging current, produced wholesale by a central station, is the lowest-cost power available.

EDISON batteries have cells of steel, an alkaline electrolyte that preserves steel and foolproof operating principle. They accept charge rapidly; are not injured by overdischarging . . . by freezing . . . by standing idle . . . by short-circuiting, reverse charging or

other electrical accidents. They are the longest-lived of all types of batteries—so long lived, in fact, that they make big savings in depreciation costs per year. They are so trouble-free that they not only cut maintenance costs; they prevent unscheduled down-time of the truck. When exchanged at convenient intervals, they afford round-the-clock power for the truck with the nth degree of dependability.

ELECTRIC MOTORS bring to industrial-truck operation the same trouble-free dependability that they afford in stationary machine drives. They also give quieter, cleaner, safer truck operation than any other kind of power. For more information send for free copy of our bulletin *Modern Material Handling* which analyses the power requirements of handling work. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

You can always rely on



# EDISON

Nickel-Iron-Alkaline Storage Batteries



**E**ver since you were knee-high to a hop-toad, you've heard about America's wonderful *natural resources*—the bountiful fertile fields, the towering timber growth, the boundless water power, and the untold wealth of gold, iron, oil, silver, coal and other natural treasures that lie buried in the ground.

Is it because America has *more* natural resources than any other country that Americans enjoy the world's highest standard of living? No—many countries have as much—some have more.

Then is it because Americans *do* more with what they've got?

Yes! And the reason is as plain as the nose on your face. It's because Americans are free to develop their natural resources—and their natural resourcefulness—in the wholesome climate of *open and strenuous COMPETITION*.

**COMPETITION**—not "regimentation"—is what eggs a man on to do his best.

**COMPETITION**—not government control—is what urges a business to give its customers ever greater value for their money.

So let's say "NO SALE" to the *ism* peddlers who would have us swap our U. S. A. system of free competition for their "planned" regimentation—trade our U. S. A. freedom and plenty for their serfdom and poverty!

\* \* \*

*This report on PROGRESS-FOR-People is published by this magazine in cooperation with National Business Publications, Inc., as a public service. This material, including illustrations, may be used, with or without credit, in plant city advertisements, employee publications, house organs, speeches or in any other manner.*

**THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER**

## Defense Contracts

### Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address:

Converter set, 73 ea., \$416,550, Western Electric Co., New York.  
Generator, 2016 ea., \$653,231, Cyclohm Motor Corp., Racine, Wis.  
Remote control equip., 802 ea., \$166,04, Automatic Radio Mfg., Boston.  
Anvils, 1660, \$49,784, Fisher & Norris, Trenton, New Jersey.  
Grinders, 303, \$35,177, The Brown-Brockmeyer Co., Dayton.  
Wrenches, 15948 sets, \$26,792, The New Britain Machine Co., New Britain, Conn.  
Wrenches sets, 61150, \$28,587, Plumb Tool Co., Los Angeles.  
Indicators, test-dial, 6135, \$83,742, W. H. Ferris 1/2, Gem Instrument Mfg. Co., Cleveland.  
Oilers, 39430, \$43,570, Eagle Mfg. Co., Wellsville, W. Va.  
Diestocks pipe threading, 334 sets, \$33,254, Greenfield Tap & Die Corp., Greenfield, Mass.  
Irona, soldering, 28560, \$50,491, Hexacon Electric Co., Roselle Park, N. J.  
Pliers, lineman's 50000, \$42,250, C. & E. Marshall Co., Chicago.  
Chests, tool, 14194, \$142,200, Highway Advertisers, Inc., Jackson, Miss.  
Tubes, straight, 152250 ft., \$107,296, Pittsburgh Steel Co., Pittsburgh.  
Pipe fitting equip., 700 sets, \$71,442, Giller Tool Supply, Dallas.  
Machine, stencil-cutting, 500 \$138,192, Diagraph-Bradley, Inc., Herrin, Ill.  
Sets, wrench, 19925, \$119,948, Barealo Mfg. Co., Buffalo.  
Jacks, 500, \$48,925, The Joyce-Gridland Co., Dayton.  
Pliers, combination, 41820, \$33,042, Kraeuter & Co., Inc., Newark.  
Wrench sets combination, 63365 sets, \$381,457, Barealo Mfg. Co., Buffalo.  
Pliers, 62610, \$52,332, C. & E. Marshall Co., Chicago.  
Pliers, 49440, \$41,035, Champion De Arment Tool Co., Meadville, Pa.  
Carpenter equip., 1800 sets, \$274,500, Atlantic Hardware & Supply Co., New York.  
Jacks, 1014, \$96,609, The Buda Co., Harvey, Ill.  
Pliers, 7500, \$29,625, Century Tool Co., Philadelphia.  
Trucks, fork-lift, 125, \$558,456, Clark Equip. Co., Buchanan, Mich.  
Trucks, fork-electric, 1089, \$4,401,782, Clark Equip. Co., Buchanan, Mich.  
Conveyors, 7743, \$221,117, The E. W. Buschman Co., Cincinnati.  
Fuse, PD, M503A1, exceeds \$250,000, Price-Pister Brass Mfg. Co., Los Angeles.  
Shell, illuminating, 60 MM, M83A1 body, excess, \$250,000, Kwikset Locks, Inc., Anaheim, Calif.  
Primer, percussion M32, MPTS, \$165,162, Olson & Rice, Inc., Los Angeles.  
Fuse, bomb, E24R1, 8000 ea., \$32,000, Eastern Electric, Inc., New Bedford, Mass.  
Knob, windage, 446348 ea., \$163,631, Drugeira Mfg. Co., Oakland, Calif.  
Swivel, stacking, 80389, \$26,201, Needham Mfg. Co., Needham Heights, Mass.  
Rod, follower assy, 555161, \$121,972, United Auto Eng. Co., New York.  
Guard, trigger assy, 10000 ea., \$478,300, Willcox & Gibbs Sewing Machine Co., New York.  
Circuit breaker, 20000, \$72,517, Kay Electric Supply Co., Atlantic City, New Jersey.  
Teletypewriter, 611 ea., \$1,708,173, National Cash Register Co., Dayton.  
Maintenance parts, Lot, \$239,386, The Hallcrafters Co., Chicago.  
Maintenance parts, 6 lots, \$110,114, Universal Electronic Laboratory, Inc., New York.  
Gasoline Engine, 322 ea., \$976,077, O'Keeffe & Merritt Co., Los Angeles.  
Flashlight, 110000 ea., \$147,070, Blake Mfg. Co., Madison, Wis.  
Dynamometer, 850 ea., \$53,617, Electro Engineering Products Co., Chicago.  
Shell, HE 155 MM M107, 400000, \$7,551,000, C. A. Dunay Co., Chicago.  
Clips, cartridge, carbine cal., .30, 2500000, 100,000, J. L. Clark Mfg. Co., Rockford, Ill.  
Fuse, PO, M48A3, MPTS, 6549, \$1,408,035, Radier Meter Mfg. Co., Milwaukee.  
Box, ammunition metal for M156 mine, 26800, 100,716, Geneva Modern Kitchens, Inc., Geneva, Ill.  
Fin shell M2 60MM mortar, 875000, \$84,787, Line Material Co., Milwaukee.  
Booster, M21A4, 3600, \$392,616, Northwest Automatic Products Corp., Minneapolis.  
Fuse, PD, M503A1, 16160, \$1,308,960, International Register Co., Chicago.  
Fuse, PD, M48A3, exceeds \$250,000, Keystone Watch Case Div., Riverside, New Jersey.



WORCESTER PRESSED STEEL CO.

DESIGN AND  
ENGINEERING

### ...Presteel is a SPECIALIST!

This message is directed to large manufacturers in varied markets, who require intricate stampings, but lack the proper facilities and knowledge for economical production.

Perhaps you're in the same position as such Presteele customers as S.K.F. Industries, Inc., Westinghouse Electric Corporation; Weston Electrical Instrument Corporation; Thomas A. Edison, Inc. . . . and other industrial leaders, who supplement their engineering talent and production skill with Presteele specialized metalworking experience and precision craftsmanship.

Presteele specializes in the solution of unusual stamping problems, the design and re-design of component parts; has pioneered in the application of new methods and in holding close tolerances in all kinds of metals. Much of Presteele's work is beyond the capacities of other stampers.

Do you need someone to organize straight-line mass production of stampings on a schedule basis? Investigate NOW!

#### Representatives in

Buffalo • Canton, O. • Chicago

Denver • Detroit • Ft. Worth

Toronto • Wilmington, N.C.

Los Angeles • New York

Philadelphia • Syracuse

WORCESTER  
PRESSED  
STEEL CO.  
405 BARBER AVE.  
WORCESTER 6, MASS.

"PRESTEEL...where problems are shaped into products"



## TECHNICAL TOPICS

### MAGNETISM IN AUSTENITIC STAINLESS STEEL

Norman S. Mott

Chief Chemist and Metallurgist

In the normal specification range for the 18-8 chromium-nickel stainless steels, especially when the carbon is low, ferrite and the resultant magnetism will often be found. It must not be construed, however, that this condition is detrimental to the properties of stainless steel; in fact, in many cases it is highly desirable.

The fully austenitic stainless steels, when heated in the carbide precipitation range (900-1600°F.) have their carbon precipitated as chromium carbide along the grain boundaries. This depletes the boundaries of chromium with the result that the alloy becomes susceptible to intergranular corrosion.

When alloys containing amounts of ferrite from 5-15% are heated in this temperature range, it is found that carbides tend to form predominantly in the ferrite areas. Since these areas are disconnected and well distributed, the condition does not promote intergranular corrosion.

Stainless steels with free ferrite up to 30% in amount retain good mechanical properties, although they show a slight decrease in ductility and toughness. Their strength and hardness are increased.

Estimation of the presence and approximate amount of ferrite may be accomplished by the use of a phase

diagram based upon nickel and chromium equivalent values.\* The nickel and chromium equivalent values are computed by the equations:

$$\begin{aligned} \text{Ni}^e &= \text{Ni\%} + 0.5 \text{ Mn\%} + 30 \text{ C\%} \\ \text{Cr}^e &= \text{Cr\%} + \text{Mo\%} + \\ &\quad 1.5 \text{ Si\%} + 0.5 \text{ Cb\%} \end{aligned}$$

The boundary line between fully austenitic alloys and those which contain ferrite is expressed by the equation:

$$\text{Ni}^e = \frac{(\text{Cr}^e - 16)^2}{12} + 12$$

When a higher percentage of nickel is specified in type 316 moly bearing alloys in order to make them completely austenitic in structure, they become susceptible to intergranular corrosion, and if they are to be heated in the carbide precipitation range, as would occur during welding, additions of columbium are required to counteract this susceptibility.

Molybdenum additions to 18-8 stainless make the alloy magnetic due to the formation of ferrite, and existing data have shown that the presence of this ferrite does not interfere with the high corrosion resistance of the alloy. In this form, it enjoys a wide range of usage where excellent resistance to corrosive media and the effects of welding heat are required.

\* A. L. Schaeffer, Metal Progress, November, 1949, p. 680-B.

Copies of this article reprinted on heavy stock for convenient filing are available on request.



The **COOPER ALLOY** Foundry Co., Hillside, N. J.

### Power

#### Atomic Energy:

Use in industry is practicable, but capital needs are high.

Use of atomic energy for industrial electric power is practicable today. Risk involved is great and heavy capital investment is necessary, but potential rewards make experimental use of atomic power in industry a must. Such are the views of Dr. Chauncey Starr, director of North American Aviation's Atomic Energy Research Dept.

At present, generation of electric power from atomic energy would have to be a by-product of weapon production. Otherwise it could not compete economically with conventional sources of electric power. But future technical development will remove industrial atomic power from the by-product stage.

On an operating basis, the investment required for an atomic power plant is about twice that required for conventional plants of equivalent output. Operating costs would also be higher, as is to be expected in any pioneering venture.

**Equal Hoover Dam**—Incentive for use of atomic power in industry is indicated in the fact that the "burning" or fissioning of 1 pound of fissionable material such as Uranium-235 will produce about 435,000 kw of heat. By "burning" 10 lb of Uranium-235, it would be possible to equal the power capacity of Hoover Dam.

In appearance, a nuclear reactor plant designed to produce electrical power would resemble present power plants. Internally, the steam boiler would be replaced by a nuclear reactor, which, though shaped differently, would be roughly the same size. The nuclear reactor would supply heat to a coolant, such as liquid metal, which in turn would boil water in compact heat exchangers. Personnel required to operate the plant would be on a par with regular power plants.

## This Week in Washington

### Play Politics on Controls Extension

Election year attitude of Congress will push through extension of controls . . . It's no time to vote "wrong" . . . See new Seaway hope . . . Plug aluminum loophole—By G. H. Baker.

Election year political maneuvering to strengthen the party's chances sometimes voids the principles of good government. This is happening today on Capitol Hill. Political expediency holds its traditional importance in 1952.

Although many congressmen admit privately that they are unable to justify in their own minds the "need" for extending federal controls over wages, prices, profits, and materials, they say that "you just can't vote for possible higher prices in an election year."

As one important House leader, Rep. Jesse P. Wolcott, R., Mich.), puts it: "If this were not an election year, controls would be out the window. But, as of today, I would think Congress will not throw them out."

**Extension Probable**—The way it looks now, Congress probably will extend controls in present form for 9 to 12 months from June 30, next. There is little doubt but that controls over materials (including CMP) will be continued in substantially their present form. Question of price and wage controls, however, still is wide open. Don't count out the possibility that major revisions may be ordered in these two controls areas. One proposal, which is known to be gaining support in Senate circles, would require price-control officials to grant compensatory higher prices to all firms faced with unavoidable rising costs.

**New Seaway Hope**—Congressional advocates of the St. Lawrence seaway project, jubilant over their victory in winning a place on the Senate's calendar of debate

for the controversial legislation, now believe there's new hope of securing final approval of the project during the current session of Congress.

Legislatively speaking, here's what has happened within the past week: Senate Foreign Relations Committee, after months of flat refusal to release any seaway bill to the Senate floor, turned at least part-way around and agreed in a 9-4 vote to release a bill (S. J. Res. 27) to the Senate floor without recommendation.

President Truman warns that if Congress does not act soon, Canada will take over the navigational aspects of the project on its own. As far as the power aspects are concerned, joint U. S.-Canada participation seems to be assured.

**Aluminum Loophole** — Senate Small Business Committee's excursion into the current uses of "hot" aluminum has resulted in the plugging of at least one CMP loophole: Manufacturers are no longer permitted to order duplicate allotments of controlled materials in the names of their subcontractors.

Investigators for the Senate committee state that some fabricators last year were able to get double allotments of aluminum by taking advantage of a flaw in CMP rules which permitted deliveries of carbon-copy allotments. It is believed that some part of last year's aluminum shortage can thus be accounted for.

**Spur Atomic Age** — Speed-up during the past year in studies related to the potential commercial uses of atomic energy is resulting in sharp reductions in the earlier estimates as to when atomic power will be commercially feasible for use by industry.

Today's educated guess: Within 5 to 10 yrs.

Gordon Dean, chairman of the U. S. Atomic Energy Commission, says the U. S. should, within this time, have a reactor capable of producing power for commercial use in selected locations where other fuels cost more.

**Saving on Expansion**—Activities of the Federal Government in weeding out duplicate proposals for expansion of plant and equipment have resulted in savings of more than \$50 million for the U. S.

Defense Production Administration's Facilities Review Board, which has responsibility for blocking unnecessary or duplicating plant expansion, says the savings it has ordered have now become mere routine.

Biggest recent job, the board says, involved talking a contractor out of a proposed \$28 million new plant, and getting him to settle for a \$3 million facility instead.

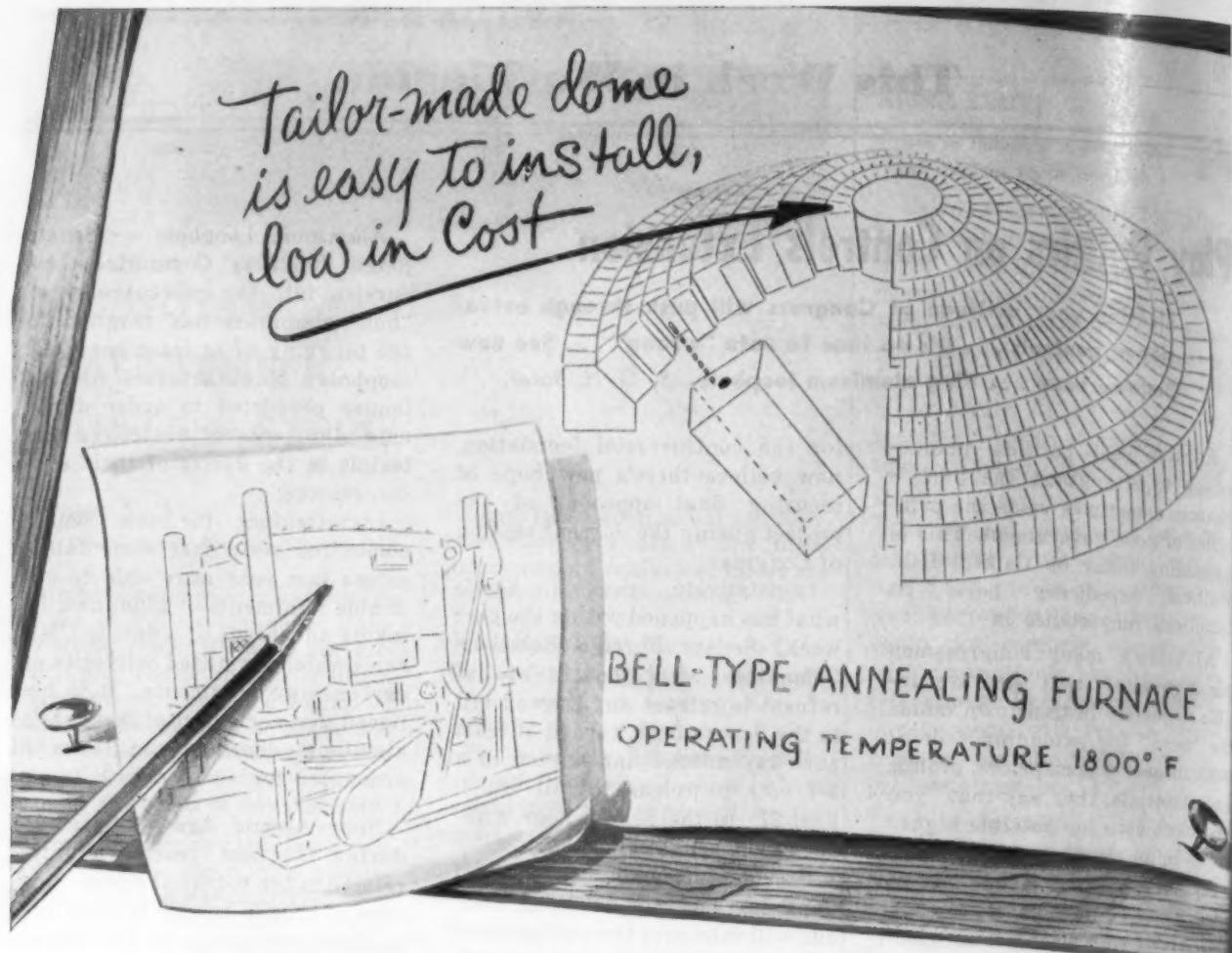
#### Quote of the Week:

General Omar N. Bradley—  
"In January, 1952, we were delivering six times the ammunition in dollar value that we were producing in January, 1951.

"In electronics and communication equipment, we were producing five times as much—and delivering it to our armed forces—as we were in January, 1951.

"In transportation, we are receiving four times as many of the major types of vehicles as we received last year.

"In tank production, in the first 3 months of 1951, we received one model of a particular tank. In April, May, and June of last year, seven were accepted. In the first 3 months of 1952, several hundred were produced and delivered."



## Which insulating fire brick would you use?

Factors which determine insulating fire brick choice vary widely from furnace to furnace. Strength may be the chief consideration in one application, top temperature limit or cost of the brick may be more important in another.

This bell-type annealing furnace, for example, operates at 1800° F. Were temperature the only consideration, Armstrong's A-20 Brick would be indicated. But because the furnace uses a controlled atmosphere, and is raised and lowered over the charge, a stronger brick is needed.

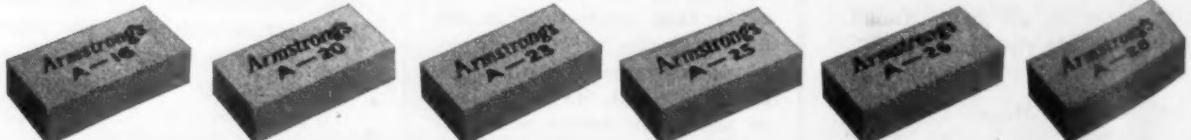
These conditions recommend Armstrong's A-23 Insulating Fire Brick. A-23's offer exceptional resistance to the deteriorating effects of controlled atmospheres. Their great strength gives maximum protection against damage during lifting.

The dome construction poses an additional problem. For this, we recommend an Armstrong "tailor-made" dome. These domes simplify furnace construction yet provide maximum strength and sta-

bility. They can reduce installation costs up to 25%. Each brick is precision tapered to fit snugly into the construction with no gaps or open spaces. Brick are so perfectly fitted they will lay up dry without slippage. Every dome is pre-assembled and checked at the factory before shipment; each course is carefully marked for quick identification on the job.

Tailor-made domes are available in all six types of Armstrong's Insulating Refractories. Each type is formulated to give you the best balance of thermal properties, strength, light weight, and resistance to spalling and shrinkage.

Next time you're faced with the problem of selecting insulating fire brick, call the Armstrong engineer. His sound knowledge of insulating refractories and their use in furnace design can help you improve unit performance. Just call the Armstrong office located nearest you or write direct to Armstrong Cork Company, 4905 Mulberry Street, Lancaster, Pennsylvania.



## ARMSTRONG'S INSULATING REFRactories

## ALUMINUM: No Expansion Decision Yet

DPA indicates it must wait for more developments after talks with U. S. officials and businessmen . . . Alcan's new aluminum offer lowers tonnage . . . Reynolds has hopes—By R. M. Stroupe.

Discussions of possible aluminum expansion plans by government officials and businessmen are "not sufficiently far along as yet" to permit a decision on future action.

This was the report from Defense Production Administration after an unnamed number of industry men had discussed expansion proposals with Sam W. Anderson, top man for aluminum at DPA. Conferences on these topics will continue, Anderson says.

Alternative to a "third round" of facilities expansion, in the view of DPA, is a much larger program of aluminum imports from Aluminum Co. of Canada. Alcan has produced a new offer involving imports of 1,110,000 tons between now and 1958.

This is a sizable reduction from the company's offer, which expired Apr. 18, of 1,850,000 tons, with 1,500,000 tons to be shipped in the period 1955-1959.

**Reynolds Contract** — Similarly Alcan has cut back its request for guaranteed purchases to 450,000 tons—50,000 in 1954 and 100,000 in each of the 4 subsequent years. Commenting on the lower figures and shorter time involved in the new offer, DPA Chief Manly Fleischmann said the new guarantees "would not materially outlast similar guarantees" the government has made to U. S. producers.

One U. S. producer, Reynolds Metals Co., is hopeful the Federal Power Commission will approve in full a contract figuring importantly in plans for a multi-million dollar aluminum plant in Arkansas. In January, Reynolds signed an agreement with Arkansas Power & Light Co. and Southwestern Power Administration for power guarantees over a 30-year period.

Initially, FPC approved power

rates in the contract for only 5 years, with the result that Reynolds was unwilling to proceed. Parties to the contract then worked out a revised agreement and filed it with FPC on Apr. 25.

After conducting a hearing on the revision, however, the commission adjourned without taking action and reported no scheduling of further meetings on the issue.

### Decontrol:

**May preview decontrol plan in May . . . Will come in dribs and drabs.**

Top controls officials say that they may be ready early in May to offer a sneak preview of their plans for decontrol of most forms of steel set for later this year.

Manly Fleischmann, Defense Production Administrator, says that the loss of steel production during the steel wage controversy, prior to government seizure of the mills, will neither alter nor delay any such plans.

This loss is estimated by controls officials as being less than



1 million ingot tons. Spread out over the remainder of the year it would have a negligible effect on the overall supply.

**Set for Fourth**—No timetable has yet been set for decontrol. But they admit that "substantial relaxation of limitations" will become noticeable with the beginning of the fourth quarter.

Officials prefer "relaxation of restrictions" to the term "decontrol," pointing out that the latter implies no limitations at all. As they now see it, while military demand is leveling off, there will not be enough of several specific types of steel to throw all production on the open market—even with retention of a military priority system.

Hence, it is indicated whatever plan is spread before industry shortly will be piece-meal in nature and an open end CMP will be kept in effect for considerable time to come.

### Zinc, Manganese Expansion Aided

A government advance of \$3,087,250 will be made to Westmoreland Manganese Corp. to build a new plant at Cushman, Ark.

In a second agreement by the Defense Materials Procurement Agency, the government will guarantee to Vernon C. Davis, Linden, Wis., a price of 15½¢ a lb for 3000 tons of slab zinc, f. o. b. East St. Louis, Ill., in order to assure new ore concentrating facilities at Edmund, Wis.

The money advanced by DMPA to Westmoreland will be used to finance a washing mill capable of processing 6000 tons of manganese ore a day and for working capital. Loan will be repaid in manganese.

Private capital will be used in expanding the Davis properties on the assurance that the government will take over at least 3000 tons of slab zinc if necessary.

Under terms of the agreement, Davis will build new facilities at the mine site to handle 250 tons of ore daily and produce 1500 tons of slab zinc annually.

### Third Quarter Steel Orders High

**Mill business looks good through Oct. 1 . . . Allocations relatively unchanged, but new capacity should boost supply . . . New bookings mainly for heavier items—By F. Sanderson.**

Canadian steel producers faced an inrush of new bookings during the week, following the opening of books for third quarter business. It is expected that within the next couple of days order placing to the end of September will be completed.

Allocations for the third quarter are approximately the same as in the first two quarters. Mill representatives see no prospects for increase. They do look for increased tonnages to be available in the last 3 months of the year when new production units come into operation.

Bookings of the week centered largely on the heavier lines—plate, structurals, reinforcing bars, and sheets—all of which continue in tight supply. On lighter items, new orders have not been so brisk. It is apparent that consumers are more confident that supplies will be available when required and are curbing long-term speculative ordering.

**Sales Resistance**—Tax reductions announced by Finance Minister Abbott this month on certain types of consumer goods have failed to have much effect on retail sales. As a result of big inventories manufacturers are curbing production. Steel requirements have been reduced accordingly. Renewed selling pressure, including price cutting, has so far had comparatively little result.

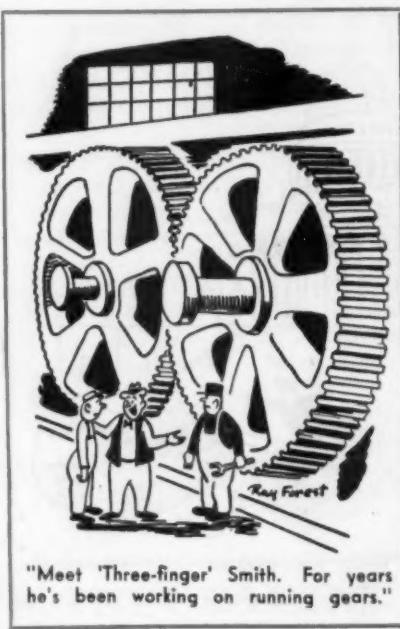
**Good Progress**—Jules R. Timmins, president of Labrador Mining & Exploration Co. Ltd., has reported satisfactory progress on construction of the railway to the Labrador iron fields, its terminal

on the St. Lawrence River, and two power plants.

Job is well up to schedule and by the year's end its back should be broken, he said. It will be possible to do much of next year's transportation by rail, but meanwhile air freight will surpass anything previously attempted.

**Shipping**—Plans are well ahead for the transportation of ore to markets. The Hanna interests have ordered three ships in England of 35,000 tons capacity. They will operate to Baltimore and Montreal, the two shipping points until the St. Lawrence Seaway is built. Land for a terminal has been bought just below Montreal. From there ore will be either shipped all by rail to steel mills in the U. S. and Canada, or transshipped by rail and canal boat to Prescott.

There it would be picked up by



Lake vessels to join the iron ore stream from the West. It is proposed to tranship at Montreal to Prescott to the extent that boats are available on the canal, but Iron Ore Co. does not expect to set up its own private line of canal ships.

The only work of consequence planned this year at the iron mines will be detailed drilling of the orebodies to be prepared next year for mining in 1954. Closer spacing along the orebodies will more clearly outline pits to be opened. It is planned to prepare several pits of varying grades so that ore may be mined to meet customer specifications.

**Defensive Action**—The St. Lawrence Seaway project came up for considerable comment here recently. N. R. Danielian, vice-president of the Great Lakes-St. Lawrence Assn., addressing the Canadian Club and the Board of Trade in Toronto, said that eastern U. S. railroads will likely take legal action to block all-Canadian construction of the seaway and power projects.

However, he added, competent legal authority, government and private, was convinced that the project could not be thwarted in the courts. But valuable time would be lost.

Mr. Danielian termed the project a sound business proposition which would yield revenues sufficient to pay the \$818 million investment, at no further cost to the taxpayers of either country. The U. S., he said, had lagged behind because of lack of knowledge about the project, but mostly because of the obstructions of a small and well-organized opposition faction.

Meanwhile in the U. S., the seaway bill has won a place on the Senate's calendar. Its American advocates view this "success" as new hope for American participation in the seaway. (See p. 109.)

# 2 ways to ease your Steel Shortage

1 Collect all dormant Steel Scrap and get it to the steel producers

Millions of tons of valuable scrap still lie idle in America. Scrap salvage means more production—a stronger America. Clean out your plant . . . sell all your iron and steel scrap to your local scrap dealer now. The need is urgent. Every bit will help to meet the needs of defense production.

KEEP IT MOVING

It's your  
SCRAP  
that makes your  
STEEL

TO YOUR  
SCRAP DEALER

2 Make your steel supply go farther — specify N-A-X HIGH-TENSILE STEEL

Users of N-A-X HIGH-TENSILE steel find they can make 3 tons do the work of 4. Through its high strength and corrosion-resistant properties, lighter sections can be used without sacrifice of quality. It fabricates and welds with the ease of mild carbon steel. Let us assist you in applying this economy to your products.

MAKE A TON OF SHEET STEEL  
GO FARTHER  
Specify—

N-A-X  
HIGH-TENSILE STEEL

... And  
"MAKE YOUR PRODUCT  
LAST LONGER"

## GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division

Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION



# The Automotive Assembly Line

## What Will Happen to Car Prices?

**Industry broods over rising costs and buyers' resistance . . . Steel price rises will halt most price cuts . . . But customers may get other breaks in a slow market.**—By R. D. Raddant.

What will happen to automobile prices?

This is the unanswered question as the industry weighs probable increased costs on one hand against an obvious reluctance on the part of buyers to pay the going price of new models.

Two recent price cuts motivated by completely opposite factors only complicate the picture. Cadillac's small cut was more or less enforced under the Capehart amendment because of lower-cost steel due to elimination of conversion steel. Kaiser-Frazer's more substantial reduction on the Henry J was prompted by purely competitive reasons.

Rest of the industry lies somewhere between these two opposites—the very high demand for the Cadillac and the lower demand for the K-F product.

**Rising Costs**—Steel prices are sure to go up when the steel strife is ended. Freight increases will also boost steel prices for automobile manufacture. This will have a spiraling effect on auto production costs.

About 1.5 ton of steel goes into the average automobile. At first glance it appears that even \$10 per ton more for steel would only add \$15 to the production cost. But that is only the beginning.

Hidden price increases are found in every one of the hundreds of steel parts supplied the auto plant. Each reflects its own increase from steel costs. These are compounded into total increases far greater than the basic steel price boost.

**Break for Buyers**—But even if factory price cuts are not forth-

coming, buyers can still benefit by a continued slow market. Auto sales profits are based on volume. Dealers will do much to stimulate sales when they lag.

Larger trade-in allowances or dealer discounts are pet devices. Discounts are frequent today in sales of slower moving models and among the independents.

Conversely, highly publicized

spent \$130 million in completely retooling, and the competition can be expected to spread a comparative sum among tool makers.

A spokesman for one of the Big Three recently proposed to National Production Authority that the bulk of second half production be permitted in the third quarter. This indicated clearly that considerable "downtime" for the change-over was in line for the fourth quarter.

**High Sales**—"Hardtop" convertible sales have advanced far beyond manufacturers' best expectations in the 3 years since their introduction in 1949.

### Automotive Production (U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Apr. 26, 1952	105,506*	30,263*	135,769*
Apr. 19, 1952	102,776	28,881	131,657
Apr. 28, 1951	125,978	36,762	162,740
Apr. 21, 1951	131,133	35,369	166,502

Source: Ward's Reports

price cuts do not always mean lower cash outlays by buyers. Cuts are frequently compensated for by lower trade-in allowances. Often the dealer may absorb some of the cut, adding more extras, or other means to compensate.

**Good Business**—Tool and die makers are looking forward to fat orders in the next few months with extensive model changeovers by several of the biggest auto producers.

Changeovers, which were once dictated by the season, are now ordered on the basis of sales. Indications are that several companies or divisions will show their 1953 cars late this year. Less than satisfactory sales will bring this about earlier than usual.

**Big Changes**—Knowledge that changes will be extensive is most encouraging to toolmakers. Ford

These sporty models are now produced with variations by most companies and divisions. They are taking up increasing space in production schedules.

Buick, largest producer of hardtops with its Riviera model, announced an additional 30 pct boost in production. It will produce more than 26,000 Rivierras in the second quarter, 28.7 pct of total output.

**Tops in Trucks**—Chevrolet's top position in passenger car production has frequently obscured its almost equally dominant position in truck production, says the company in a just issued study of its truck output.

Trucks have been turned out by Chevrolet at a consistent rate of one for every three passenger cars regardless of production pace. In the record production year of 1950, 521,095 trucks were produced of a total production of 2,108,273.

### Defense:

Dual purpose plants proposed for both civilian and war output.

Development of a nationwide system of dual purpose plants as the best method of simultaneous war and peace production is advocated by General Motors planners.

In a recent address before an American Ordnance Assn. chapter, J. F. Wolfram, vice-president of GM and general manager of Oldsmobile, outlined a system of combined operations. He urged it as a "continuing policy" for an indefinite period of preparedness for the nation.

**Others Disagree**—Dual purpose plants are not accepted unanimously by industrialists. K. T. Keller, Chrysler board chairman, differs in his defense theories. He favors a system of pilot plants with token production which can be converted to mass production when the need arises.

Mr. Wolfram speaks with authority on dual purpose. Oldsmobile is a good example in that it has been making bazooka rockets and tank cannon in volume without disturbing its car production facilities.

**Help Needed**—But government cooperation and support is needed to maintain dual purpose plants. It cannot be done on an individual plant basis. Mr. Wolfram says these steps must be followed for a successful system:

(1) Defense Department must recognize each plant as a facility for producing specific products on a long-time basis. Continuing government contracts would be necessary to utilize the plant's capacity.

(2) Contracts must be made to provide for the most efficient storage of machine tools and other equipment used in war production.

(3) Contracts must be made to provide for pilot lines of war production. These would serve

as the core of quickly expanded defense work in emergencies. It would also enable continuous improvement of the product and production methods.

### Chrysler Blasts Ford's Quota Try

Chrysler Corp. lived up to its advance billing in filing a two-fisted reply to Ford's attempt to revise production quotas for the remainder of 1952. (THE IRON AGE, Apr. 17, 1952, p. 90.)

It delivered a blistering attack on Ford to preserve its position as No. 2 in total production. The Ford proposal to extend the base period into 1950 would have edged Ford into second place at the expense of Chrysler.

"What Ford proposes is creating for itself under government controls a standing in the industry that its own efforts have not brought it in any of the past 17 years," the Chrysler brief stated.

**Position**—The Ford proposal would give both Ford and Chrysler,

as well as General Motors, minor increases in production allotments. Difference is one of position, not production.

The situation also put Chrysler with strange bedfellows. It is joined against another of the Big Three with almost all the independents except Studebaker. Also protesting against the Ford plan are Kaiser-Frazer, Packard, Hudson, Willys-Overland, Nash, and Reo. General Motors, which will maintain its top position regardless of the tussle, has not taken action as yet.

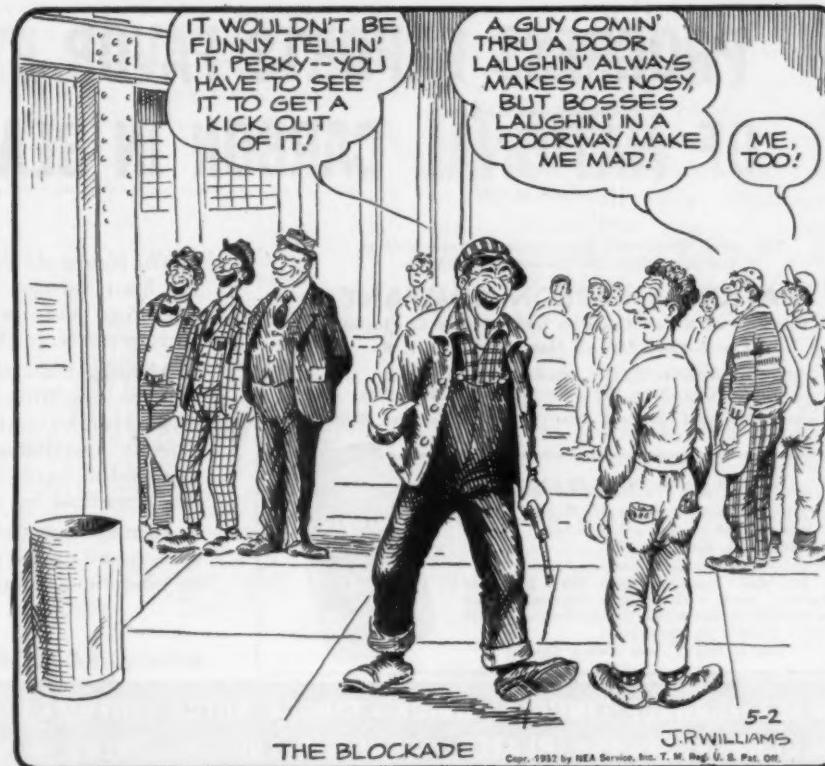
### Power Steering Makes Big Hit

Power steering made its first general appearance in the automobile market this year. Indications are that it is headed for as wide use as automatic transmissions.

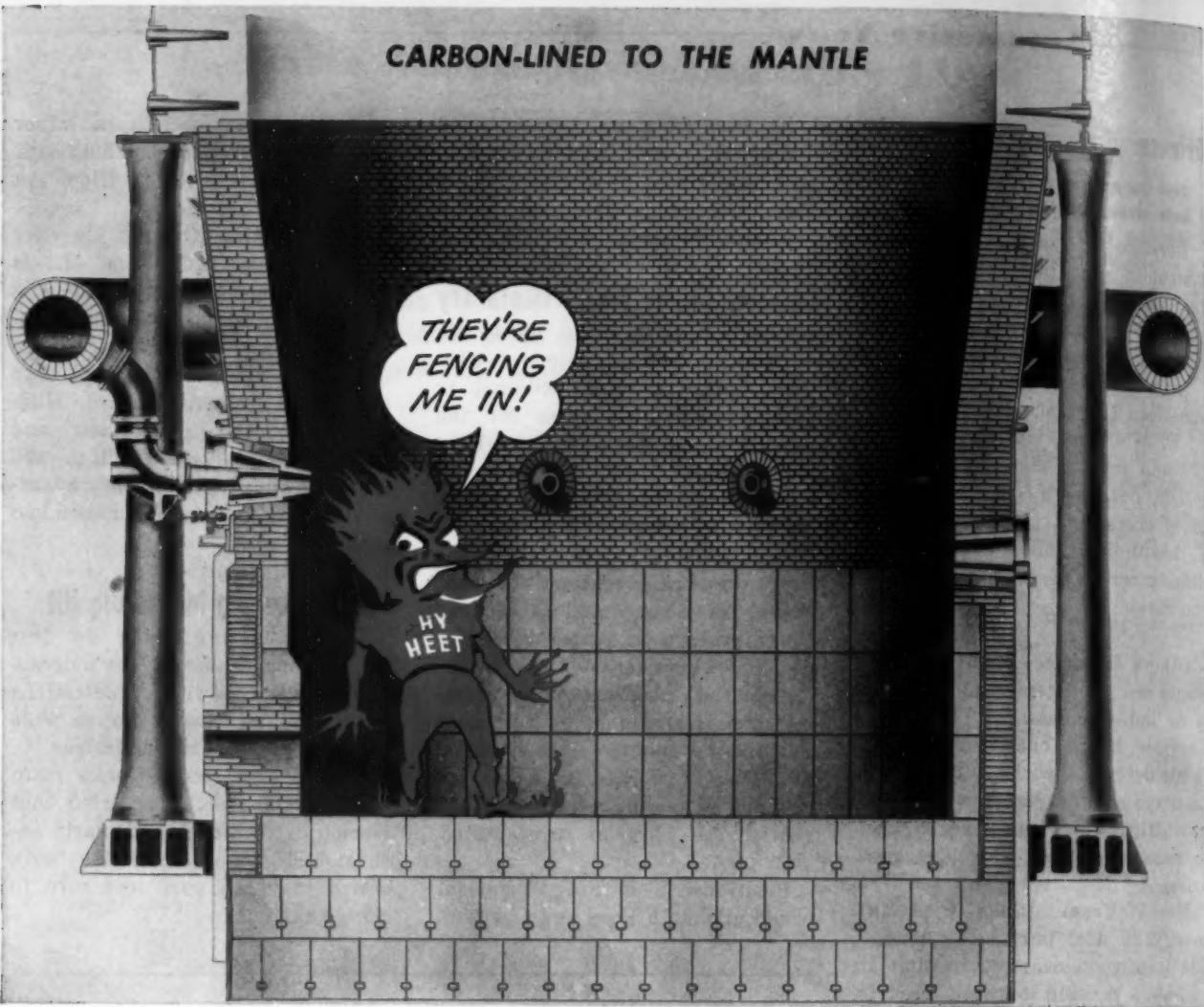
G. R. Jones, general sales manager of Oldsmobile, reported that women drivers are particularly enthusiastic about the ease with which they can park and turn in close quarters.

### THE BULL OF THE WOODS

By J. R. Williams



CARBON-LINED TO THE MANTLE



## PROGRESS REPORTS FAVOR EXTENDED USE OF NATIONAL CARBON IN BLAST FURNACES

TRADE-MARK

The term "National" is a registered trade-mark of  
Union Carbide and Carbon Corporation

**NATIONAL CARBON COMPANY**  
A Division of Union Carbide and Carbon Corporation  
30 East 42nd Street, New York 17, N. Y.

District Sales Offices: Atlanta, Chicago, Dallas,  
Kansas City, New York, Pittsburgh, San Francisco  
In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

### WHY BUY THIS ITEM?

It gives you double the usable light!  
No metal can to leak or corrode!  
It can't stick, swell or jam!  
It delivers the whitest, brightest light!  
It's the "Eveready" No. 1050 flashlight  
battery, made with the zinc electrode inside  
a carbon jacket — just the reverse of every  
other battery on the market.  
Test it and . . . you always buy it!



● The future of "National" carbon as a preferred material for blast furnace linings is definitely assured by the mounting evidence of its extra long life in hearths and, more recently, in side walls all the way up to the mantle.

Already, indications are that, as carbon goes *up* the furnace, operating costs come *down*. Fewer shut-downs, more uniform casts are consistently being obtained in existing installations. And increased capacity can be expected to result from the use of thinner wall sections, made possible by this ideal furnace-lining material.

Furnace operators are urged to keep their eyes on carbon and on the growing body of data covering its use in modern, high-tonnage-life furnaces.

### OTHER NATIONAL CARBON PRODUCTS

BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

## West Coast Report

### Copper Ore Development Pushed

**Government allots San Manuel Copper Corp. \$111,288,000 for low grade Arizona ores . . . Aim at annual output of 10 million tons of 0.72 pct copper ore . . . Build town—By T. M. Rohan.**

The government's frantic search for more domestic copper was extended into low grade ores last week.

With an eye toward development for defense use the U. S. jumped in with both feet by indicating the RFC would shortly approve the biggest single business loan ever made by the government.

San Manuel Copper Corp., a wholly owned subsidiary of Magna Copper Co., New York, was allotted \$111,288,000 for development of the San Manuel deposit in Pinal County, Ariz. San Manuel expects to produce 10 million tons of ore annually from which it will extract 140 million lb of copper and 6 million lb of molybdenite. The copper content is estimated at a lowly 0.72 pct compared to over 5 pct in other mining areas.

**Copper Town**—The new project requires building a whole new town, milling 30,000 tons of ore and smelting 800 tons of concentrates daily and providing power, water and rail facilities. RFC Administrator Harry A. McDonald said "it has been determined by defense mining experts as a feasible and essential operation."

The ore has been considered as far too low grade for profitable exploitation in normal times. It is reported that the venture will be backed through a rapid amortization certificate, price supports, and a government contract for a part of the copper and molybdenite output for several years.

Although a member of the Numont Mining Co. of New York, one of the largest in the world, Magna's only other copper venture in the U. S. is the comparatively

small Superior, Ariz., mine. This is famous in the industry for its 5.53 pct copper but with a total ore yield of only 306,899 tons.

**Tin Cans Help**—Meanwhile housewives in Los Angeles are doing their part to get more copper by setting aside their tin cans which are collected, shredded and sent to Arizona mines. Water from the mines is pumped over them and the copper which has been leached from the ores is precipitated with the cans at the rate of 4 lb for every 5 lb of cans.

Can collections in Los Angeles and some in South San Francisco are inadequate, however. When Anaconda's new plant at Yerington, Nev., is completed, 4000 additional tons of cans per month will be required. These may be collected from San Francisco, Portland, Ore., Tacoma and Seattle.

DPA recently announced pur-

chase of 1,735,000 lb of electrolytic refined copper from the Yucca Mining & Milling Co., Yucca, Ariz., at 34.35¢ per lb compared with the current ceiling price of 27.075¢ per lb in that area.

**More Competition**—Western cast iron pipe manufacturers with already bulging warehouses faced a new thorn in their side last week. Keasbey & Mattison Co. of Ambler, Pa., announced it has purchased a 26-acre tract at Santa Clara, Cal., 50 miles south of San Francisco. It will manufacture 4 tons per hr of 4 to 16 in. internal diameter asbestos-cement pipe. Basic plant equipment will consist of a Mazza pipe machine. Total investment will be \$2,750,000 and employment, 175 persons.

Asbestos cement pipe generally undersells cast iron by about 10 pct and is gaining increasing usage by small municipal water systems. It generally contains about 85 pct cement and 15 pct asbestos, principally as a bonding agent.

Although lighter in weight and more prone to crack when unsupported, asbestos cement pipe claims greater resistance to corrosion by electrolytic action in marsh and salt water saturated areas. Both types, however, boast extremely long life and can generally be amortized at only 1 to 2 pct annually.

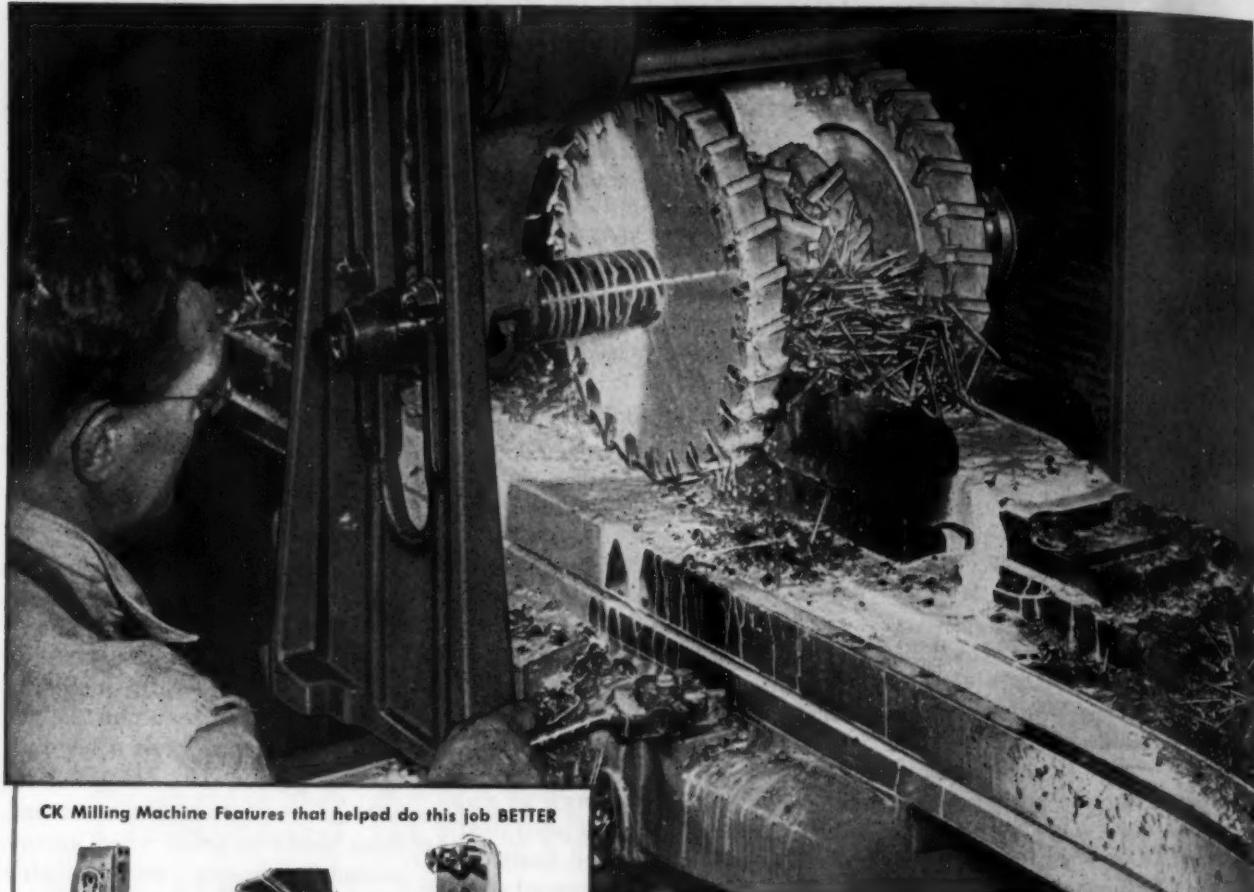
**Caught in the Shuffle?**—Northwest Steel Rolling Mills at Seattle which was seized by the government, although it has a contract extension with the United Steelworkers, is refusing to set up accounting procedures, etc., to comply with government directives.

It has been their traditional practice to draw up a new contract 30 days after Big Steel reaches its agreement. Repeated protests to Washington have not been answered.



FACTS TELL THE STORY...

# NEW CK MILLING MACHINE PAYS USER BIG PRODUCTION DIVIDEND



CK Milling Machine Features that helped do this job BETTER



New CK column easily absorbed vibration from heavy cutting load.



CK's large (2" dia.) screw and extra-long table feed nut permitted heavy cut.



No. 60 heavy-duty drive flange on spindle drives heavy-duty arbor with multiple cutters.



CK's positive, metered, pressure and automatic lubrication assured wear-free operation.



Greater Horsepower of CK machine meant maximum results from modern cutting tools.



CK's 3-bearing spindle and flywheel assured fastest metal removal with desired finish.



24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds ( $\frac{1}{8}$ " to 90 ipm) meant operator selected exact combination to get fullest advantage from high horsepower and modern cutting tools.

## The FACTS on this job are:

Machine: New 25hp No. 5, Model CK Plain.

Material: Cast Steel, 150 Brinell.

Feed:  $4\frac{1}{2}$  inches per minute.

Cutter Speed: 100 Surface feet per minute.

Rate of metal removal: 17.5 cu. in. per min.

Production rate: 4 parts per hour.

NOTE: Each part requires but a single pass of the cutter on the new Kearney & Trecker CK machine.

Old production rate  $1\frac{1}{2}$  parts per hour with two passes required per piece.

Investigate Kearney & Trecker's new CK line of milling machines. You'll find every feature is test and job-proven to give you cost-cutting results... greater machine capacity... greater productivity... better finished products. Contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER  
MILWAUKEE  
MACHINE TOOLS



## Machine Tool High Spots

### Washington Learned the Hard Way

Planners are three-time losers in learning that machine tools are a must in emergency . . . Seems now that some steps will be taken to protect industry at war's end—By G. Elwers.

In both world wars, and in the present defense emergency, the planners in Washington belatedly discovered that the machine tool industry is vital to this country's defense. At the end of each war production period, this fact was forgotten. Then it had to be discovered all over again the next time. This has been risky and wasteful.

It now appears that maybe this time the thrice-experienced lesson will stick. The industry is certainly making every effort to make it stick.

**United Front**—Joint action by the National Machine Tool Builders' Assn. and the American Machine Tool Distributors' Assn. was advocated at the recent AMTDA meeting in Chicago by F. S. Blackall, Jr., president of the NMTBA.

Mr. Blackall proposed several points on which both groups ought to get together in making recommendations to the machine tool commission Washington is going to set up.

Among the points mentioned were the question of depreciation rates for tax purposes, tax recognition of the cyclical nature of the machine tool business, stockpiling, and renegotiation.

**Listening at Last**—Though they've worked hard, it has taken machine tool builders and distributors over a year to make themselves heard in Washington.

Even after they've managed to sell government planners on the fact that a problem existed, they had to fight to have sincere attention paid

to their proposed solutions. Now that they have begun to win acceptance, they don't intend to give it up.

**Ratings Still Hold**—The NPA wants it known that any outstanding orders which still have DO-46 ratings are still good. Some buyers have been confused, and thought the ratings had to be converted to DO-Z3 ratings.

Most orders with DO-46 ratings have by now been filled. Any which are still unfilled are still good, the NPA says.

Not so with orders bearing DO-U4 ratings, which have been helping some Detroit firms complete their new engine tooling. Under Direction 5 to CMP Reg. 6, NPA says, orders with the DO-U4 ratings must be converted to DO-Z3.

**English Order** — The United Kingdom has just been authorized

by the Mutual Security Agency to order \$14 million more in machine tools from U. S. builders. Delivery dates as late as March, 1954, are authorized.

So the U.K. continues to be a good customer. It didn't look so good when, a couple of months ago, it cancelled about 300 machines. This hit hard because it came at the same time as the flood of cancellations from U. S. Air Force contractors.

Actually, the 300 cancellations were replaced soon after by orders for more than 300 other machine tools.

**Slight Rise in Orders**—Preliminary figures from the National Machine Tool Builders' Assn. indicate that the new order index for machine tools rose to 327 in March from February's level of 318.8. This is still below the January level, and lower than any month of 1951.

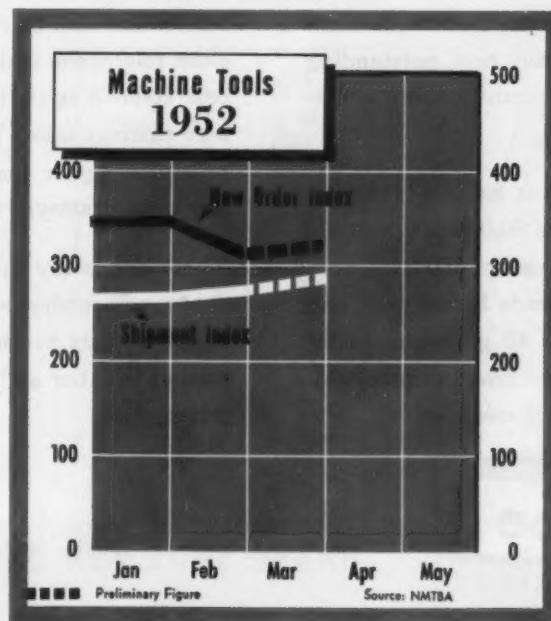
The foreign order index rose in March to 22.5 from February's 14.4. The February level of new foreign orders was lower than any month of 1950 or 1951.

Shipments in March rose, as has been the case in every month since Korea, to an index level of 293.9. In February it was 279.6.

The overall industry backlog, based on the demonstrated production rates as of March, stood at slightly under 16 months.

**Staunch Friend**—The machine tool industry will lose its top friend at court when Clay Bedford retires as special assistant to the Secretary of Defense.

The industry hasn't always agreed with his ideas, but it has realized that no top Washington official was trying so hard to build up and keep a strong machine tool industry.

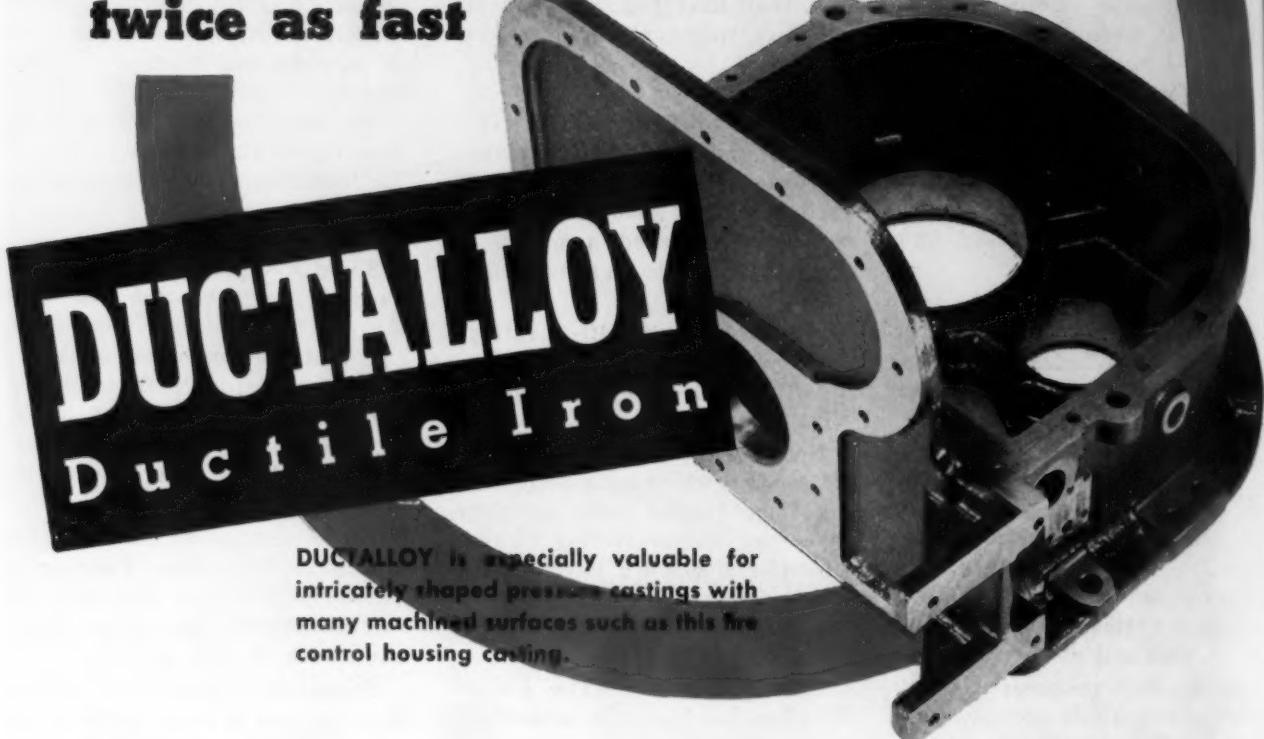


# **STRONGER**

**than mild steel**

# **MACHINES**

**twice as fast**



**DUCTALLOY** is especially valuable for intricately shaped pressure castings with many machined surfaces such as this fire control housing casting.

DUCTALLOY, the new cast iron that bends without breaking, possesses many new, outstanding advantages, one of which is remarkable machinability.

In the annealed condition it has a guaranteed minimum tensile strength of 60,000 psi, yet it can be machined at a cutting speed of 980 fpm, more than double the rate for grade B cast steel and 2 to 3 times that of class 40 gray iron under identical conditions. The machined surface compares favorably with that of steel.

DUCTALLOY can be cast in intricate shapes with close tolerances and less machining stock than cast steel—it is particularly valuable for pressure castings which remain tight at hydrostatic pressures higher than the shattering point for any gray or alloyed cast iron.

There are many applications in which DUCTALLOY will render better service and contribute to lower costs in the finished product through savings in labor and machining time. Write for information.

AMERICAN  
**Brake Shoe**  
COMPANY

BRAKE SHOE AND CASTINGS DIVISION

230 Park Avenue, New York 17, N.Y.

# Industrial Briefs

**Branch Plant** — WOODALL INDUSTRIES, INC., Detroit, has opened a 45,000-sq ft branch plant at 801 West Valley Blvd., El Monte, Calif. Plant will make aluminum parts and steel castings for interiors of Douglas C-124 cargo planes.

**Division Expanded** — Manufacturing division of CRO-PLATE CO., Hartford, has been expanded to include an area of 10,000 sq ft at the company's Windsor St. plant. The contract plating division, which formerly shared factory space with the manufacturing division, has been reduced and transferred to the East Hartford plant.

**Appointment** — TUBESALES, Los Angeles, has appointed Elvin A. Svendsen as its sole agent in Northern California. Mr. Svendsen and his organization will devote their time to selling and stimulating new uses for steel pipe and tubing in carbon, alloy and stainless grades, with offices at 268 Market St., San Francisco.

**New Address** — CINCINNATI MILLING MACHINE CO., Cincinnati, has moved its Philadelphia area sales office to 580 Lancaster Ave., Bryn Mawr, Pa. The new office will be managed by Eberhardt Reiniger.

**Transfers Office** — E. W. BLISS CO., Toledo, has transferred its New Haven, Conn., district office from 29 Church St. to 7 Whitney Ave.

**International Seminar** — Dr. Paul Schwarzkopf, president of the American Electro Metal Corp., Yonkers, N. Y., and owner of Metallwerk Plansee, Reutte, Tyrol, has invited colleagues and friends of powder metallurgy to attend the FIRST PLANSEE SEMINAR "De Re Metallica" in Reutte, Austria, June 22-26.

**New Warehouse** — LEVINSON STEEL CO., Pittsburgh, has begun construction of its new warehouse at Galion, Ohio. Sidney Moidel will be in charge of the new office, which will absorb the Mansfield, Ohio, office. Completion is scheduled for late summer.

**Steam Plant** — An \$88 million generating plant is being built by the Tennessee Valley Authority along the Ohio River near Paducah, Ky. Named the

**Program Scheduled** — A building program costing more than \$3 million will be started at the La Porte, Ind., Works, Tractor Div., ALLIS-CHALMERS MFG. CO.

**Corporation Formed** — Arie Vernes, president, Philips Export Corp., and A. R. Palit, formerly head of the India Supply Mission in Washington, have formed a new corporation for trade between the U. S. and India. Company, known as PHILIPS-PALIT CORP., will be located at 100 E. 42nd St., New York.

**Construction Started** — BENJAMIN WOLFF & CO., Chicago, has started construction of a new warehouse building in the Clearing Industrial District, Melrose Park section. The new warehouse, which will cost \$1,500,000, will be completed late in the fall.

**New Location** — F. W. STEWART MFG. CORP., Chicago, has opened a new Los Angeles plant at 1638 S. Flower St. The plant will be devoted to manufacture and fabrication of flexible shaft assemblies, flexible shafting, and components.

**Regional Warehouse** — VASCOLOR-RAMEL CORP., Waukegan, Ill., a subsidiary of Fansteel Metallurgical Corp., Chicago, has established a regional warehouse, sales and service department in Birmingham.



"Acheson, if this works, we'll make you assistant vice-president in charge of employment and training."

**Station Closed** — PITTSBURGH STEAMSHIP DIV., U. S. Steel Co., has closed its marine supply station at Conneaut Harbor, Ohio. Henceforth ships of the fleet will be supplied from the division's station at Sault Ste. Marie, Mich.

**Dedication Plans** — The new Metals Processing Laboratory at MASSACHUSETTS INSTITUTE OF TECHNOLOGY will be dedicated on Tuesday, June 3. On June 4-5 there will be a technical conference on metal cutting.

**Anniversary** — EDWARDS CO., Norwalk, Conn., the oldest manufacturer of electric signaling equipment, celebrated its 80th anniversary at a press conference luncheon at the Hotel Biltmore, New York.

**Knudsen Award** — INDUSTRIAL MEDICAL ASSN. presented its 14th annual William S. Knudsen award to Dr. Max R. Burnell, medical director of General Motors. The award is given for the year's outstanding contributions to industrial medicine.

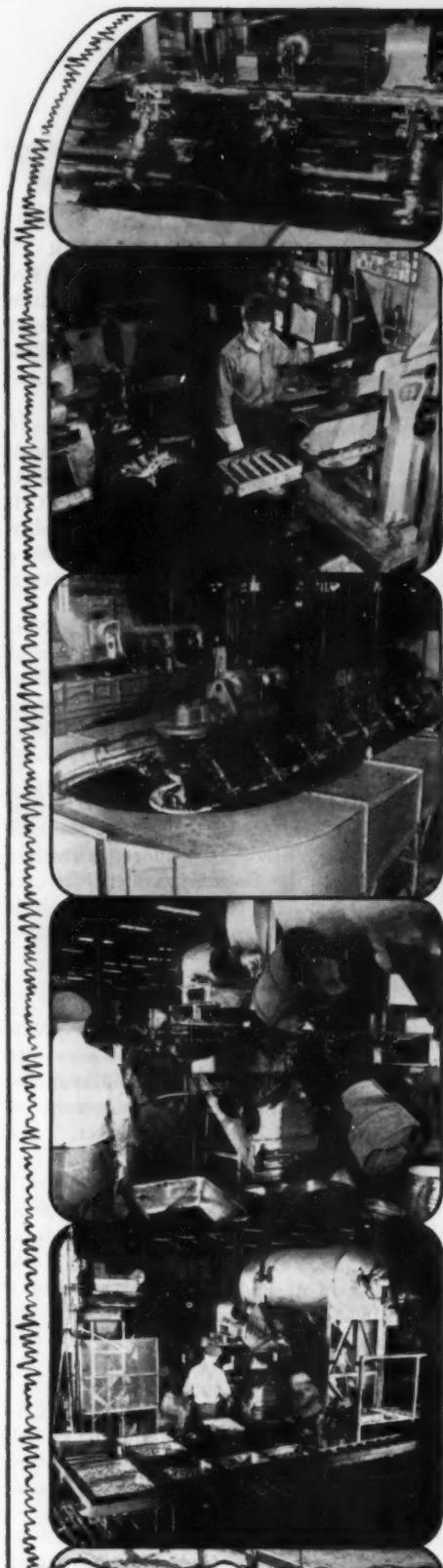
**Site Purchased** — INTERNATIONAL BUSINESS MACHINES CORP., New York, has purchased a 50-acre site 40 miles southwest of Indianapolis. Plans for industrial development of the site will be announced later.

**SHAWNEE STEAM PLANT**, it will furnish about half the electrical power for a \$500-million Uranium-235 plant of the Atomic Energy Commission at Paducah. Contracts for a 2189-ft dock and a coal barge unloading system have been awarded to Dravo Corp., Pittsburgh.

**New Partners** — PARSONS, BRINCKERHOFF, HALL & MACDONALD, Engineers, New York, have admitted Walter S. Douglas and Alfred Hedin to the partnership.

**Engineering Contract** — A contract to engineer a process development plant for Nickel Processing Co. has been awarded to H. K. FERGUSON CO., New York and Cleveland.

**Land Purchased** — Approximately 200,000 sq ft of additional land adjacent to their main office and works has been purchased by ILLINOIS GEAR & MACHINE CO., Chicago.

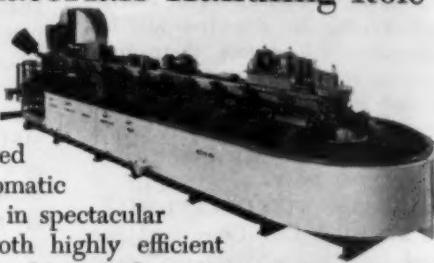


*Frederic B. Stevens, INC.*

presents

# AN INDUSTRIAL ALBUM

**Starring**  
**The STEVENS MODEL "C"**  
**Automatic Barrel Plating Machine**  
**In A New Materials Handling Role**



"An Industrial Album," the new Stevens motion picture, shows world-famed Stevens Model "C" Automatic Barrel Plating Machines in spectacular double roles—that of both highly efficient plating and processing machines *and* as vital units in a completely automatic materials handling system. Never before has the entire story been shown on a motion picture screen!

See this dramatic presentation of what Stevens Full Automatic Barrel Plating and Processing Machines can do in actual production. Learn the full story of the many and varied operations this unit does while reducing costs and upping production. It's something you and others in your company cannot afford to miss. Make arrangements now to have a showing of "An Industrial Album" for your plant engineers, your trade association, club, school or professional group. Just call your nearest Stevens sales office or write direct to Frederic B. Stevens, Inc., Detroit 16, Michigan.

A TRULY GREAT  
INDUSTRIAL  
MOTION PICTURE!



METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B.

BUFFALO • CHICAGO • CLEVELAND  
INDIANAPOLIS • NEW HAVEN  
Representatives in Other Principal Cities

**STEVENS**  
DETROIT 16, MICHIGAN

INCORPORATED

FREDERIC B. STEVENS OF CANADA, LTD.  
WINDSOR • TORONTO  
ONTARIO

# The Iron Age

## SALUTES

Peter V. Martin

A world traveler, he serves both his country and his industry by spreading U. S. technical skill.



**P**ETE MARTIN is a hard man to catch up to. Since 1945, the newly appointed vice-president of Koppers Co.'s Engineering & Construction Div. has been on the job in India, Pakistan, Germany, France, England, Belgium and Japan. He just took off for Santiago, Chile, to become Koppers representative on the board of directors of Pacific Steel Co. of Chile.

He did manage to stay put for over 20 years with the former Carnegie-Illinois Steel Corp. Joining that company after graduation from Illinois Tech in 1937, he became superintendent of blast furnaces, Gary Works, and Chicago District Director of Industrial Relations. Then he joined Military Government in Germany in 1945, and started his travels.

In Germany Pete served as chief of the raw materials coke plant and blast furnace section; as chief of the industry branch; as deputy director, Economics Div.; and as chief, U. S. Element, Bi-Partite Economic Control group.

He joined Koppers in 1947, but kept on traveling. Most of 1951 was spent in India as technical adviser to the government on steel industry problems.

Pete is considered a brilliant blast furnace technician. In 1937 he won the American Institute of Metallurgical Engineers' Johnson Award for a paper on loss problems in those furnaces.

A native of Lima, Ohio, he owns a 20-acre estate outside of Pittsburgh in Fox Chapel, but never gets much time to enjoy it. He still hopes to find time to indulge his twin hobbies of flower raising and woodworking there. And some day he'd like to take up golf in earnest, if he can ever get a chance to practice.



**"WE WON'T NEED THE UMBRELLA ANY MORE, DEAR.  
THEY INSTALLED READING COPPER TUBING  
TODAY. THERE WON'T BE ANY MORE LEAKS!"**

For a dependable source of supply . . . specify  
Reading brass and copper tubing . . . processed  
from the basic metal to the finished tubing in  
one of America's finest completely integrated mills.

## READING TUBE CORPORATION

Producers of Reading Lektroneal Copper Tubing  
and Reading Brass Tubing



OFFICES AND EASTERN DISTRIBUTION DEPOT:

36-12 47th AVE., LONG ISLAND CITY, N. Y.  
WORKS: READING, PA. STILLWELL 6-9200

Stocks Available at ALL Reading Distribution Depots:

- READING, PA. • HOUSTON, TEXAS: 1121 Rothwell St.
- LONG ISLAND CITY, N. Y. • CHICAGO, ILL.: 724 W. 50th St.

# The Iron Age

## INTRODUCES

Morse G. Dial, elected president, UNION CARBIDE & CARBON CORP., New York. Kenneth H. Hanan, elected treasurer, and Walter E. Remmers, elected vice-president, Alloys Div.

A. R. Booker, formerly executive vice-president and general manager, elected president, ELECTROFILM CORP., North Hollywood, Calif.

Robert F. Huntley, elected president, COWLES CHEMICAL CO., Cleveland. He succeeds Edwin Cowles, who will continue as a director.

Arthur P. Hall, becomes vice-president in charge of public relations and advertising, and C. F. Nagel, Jr., chief metallurgist, becomes a vice-president, ALUMINUM CO. OF AMERICA, Pittsburgh.

Harry L. Edgcomb, Jr., formerly general sales manager, elected vice-president in charge of sales, EDGCOMB STEEL CORP., Hillside, N. J., and M. O. Kopperl, formerly vice-president, elected executive vice-president.

James J. Slattery, elected vice-president and general sales manager, GENERAL ELECTRIC APPLIANCES, INC., Bridgeport, Conn.

R. H. Kitzman, vice-president and manager, Toledo plants, appointed general production manager, DOEHLER-JARVIS CORP., Toledo.

Anthony J. Snyder, named assistant to the president, MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass.

Carl S. Abion, promoted to Ohio district manager, LURIA BROS. & CO., INC., Philadelphia.

Robert M. Whitney, promoted to sales manager, AUTOMATIC TRANSPORTATION CO., Chicago.

R. M. Clemans, formerly Wheeling district sales manager, appointed manager of secondary sales; V. C. Dollman, formerly Pacific Coast sales manager, appointed Wheeling district sales manager; C. S. Larsen, formerly assistant manager, New York district sales, appointed Pacific Coast sales manager; and C. E. Bates, Jr., appointed assistant manager, Metal Decorating Sales Div., WHEELING STEEL CORP., Wheeling, W. Va.

Kenneth G. Huback, appointed sales manager, Foundry & Commercial Weldment Dept., BALDWIN-LIMA-HAMILTON CORP., Philadelphia.

Alan H. Redpath, appointed to the newly created position of merchandising manager; and R. S. Frommer, appointed manager, central sales inventory and production planning department, tape products, MINNESOTA MINING & MFG. CO., St. Paul.

Donald F. McVey, appointed regional sales manager, southwest sales region, and J. C. Caspary, Jr., appointed assistant sales manager, WILLYS - OVERLAND MOTORS, INC., Toledo. Mr. McVey will have headquarters in Dallas.

Paul H. Darges, promoted from assistant traffic manager, to traffic manager, RUST ENGINEERING CO., Pittsburgh. He succeeds the late Frederick R. Cunliffe.

Merle F. Schreurs, appointed manager, new coating research and development laboratory, INDUSTRIAL OVENS, INC., Cleveland, and John F. Allen, appointed manager, Allen Extrusion Machinery Div.



JOHN J. HAYES, JR., elected vice-president and general manager, Morse Twist Drill & Machine Co., New Bedford, Mass.



GORDON W. CAMERON, becomes vice-president and treasurer, Aluminum Co. of America, Pittsburgh.

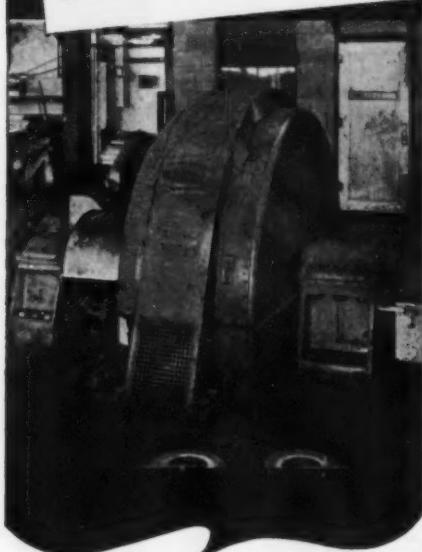


J. W. RIMMER, appointed manager, newly created Market Development Staff, Columbia-Geneva Steel Div., U. S. Steel Co., San Francisco.

# For Sale

## 2000 H.P. Slip Ring Motor

General Electric, 3 phase, 60 cycle  
2200 V. 236 RPM. Type MT-30-2000-240  
Serial No. 5217277



**CALL  
Curry!**

Typical of our larger stock items, the motor shown above is in perfect operating condition, complete with same-as-new controls, which include start and stop, reversing, in and out plugging and liquid slip regulators. Complete description, wiring diagrams and arrangements for inspection available on request.

In addition to the motor shown above Curry offers a wide range of surplus steel plant equipment . . . including complete rolling mills, forging presses, lathes, roll grinders, slitters, cranes, shears, ladles, etc. All in good operating condition, this equipment is ready for immediate installation.

See our ad on page 221

WRITE FOR THE "CURRY LIST" TODAY!

ALBERT  
**Curry** & CO. INC.

STEEL PLANT EQUIPMENT

941 OLIVER BUILDING • PITTSBURGH 22, PENNA.  
Phone ATLantic 1-1370

## Personnel

Continued

Walter S. Scheel, promoted to chief engineer; Lawrence G. Boughner, promoted to assistant chief engineer, development; Kenneth M. Koch, promoted to assistant chief engineer, application; and William L. Pringle, promoted to assistant chief engineer, military, TIMKEN-DETROIT AXLE CO., Detroit.

John N. Lind, appointed general traffic manager, NATIONAL SUPPLY CO., Pittsburgh. He succeeds Martin C. Richards, who has retired.

Paul Kjelstrom, succeeds N. J. Kassnel as chief engineer; Chris Zeilenga, appointed chief engineer for research and development; and Henry DeMatteo, named assistant works manager, VERSO ALLSTEEL PRESS CO., Chicago.

O. B. Wilson, named field sales manager, Industrial Div., MINNEAPOLIS-HONEYWELL REGULATOR CO., Minneapolis. Mr. Wilson succeeds William H. Steinkamp, who was recently made general sales manager of the division.

Charles F. Keyser, appointed Central District sales manager, Shakeproof, a division of ILLINOIS TOOL WORKS, Chicago.

John R. Millikin, appointed office manager, Pittsburgh branch, CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh.

Arthur R. Lytle, appointed director of research; Walter Crafts, appointed associate director of research; and David Swan, appointed assistant director of research, UNION CARBIDE & CARBON RESEARCH LABORATORIES, INC., New York.

Fred W. Alger, transferred from the St. Louis sales office to Birmingham as assistant to the vice-president, PULLMAN STANDARD CAR MFG. CO., Chicago.

William B. McGorum, formerly district sales manager, promoted to sales manager Hall-Scott Motor Div., ACF-BRILL MOTORS CO., Berkeley, Calif.

Hollister G. Gergus, appointed general sales manager, DAVID ROUND & SON, Cleveland.

C. B. Holst, named manager, newly created model change systems department, FORD MOTOR CO., Dearborn.



N. J. KASSNEL, appointed vice-president in charge of engineering, Verson Allsteel Press Co., Chicago.



ALVA L. CREMEAN, appointed vice-president in charge of manufacturing, Bunting Bronze & Brass Co., Toledo.



DR. I. A. OEHLER, appointed administrative assistant to the executive vice-president, American Welding & Mfg. Co., Warren, Ohio.



L. B. PERKINS, elected vice-president and treasurer, and appointed general manager, D. A. Stuart Oil Co., Ltd., Chicago.



**PRODUCTION MASTERPIECE**

**THE *Logan* LATHE**  
*Puts Profit In Production*

Industry's respect for the Logan Lathe as a metalworking production tool is not an overnight development. Through the years, Logan Lathes have put many a production line on a profitable basis. Today, with its 11" swing, 1" collet capacity, and 1 $\frac{3}{8}$ " spindle hole, the production efficiency of the Logan Lathe is being used on a wider scale than ever before.

The Logan is easily set up for every type of lathe turning operation. The Logan ball bearing mounted spindle has the sustained accuracy at high speeds to

hold precision tolerances. The lasting accuracy and rugged durability of Logan construction keep production going at top efficiency, at minimum cost per finished part. For the production line, tool room or machine shop, no other lathe of comparable specifications can match the Logan in economy.

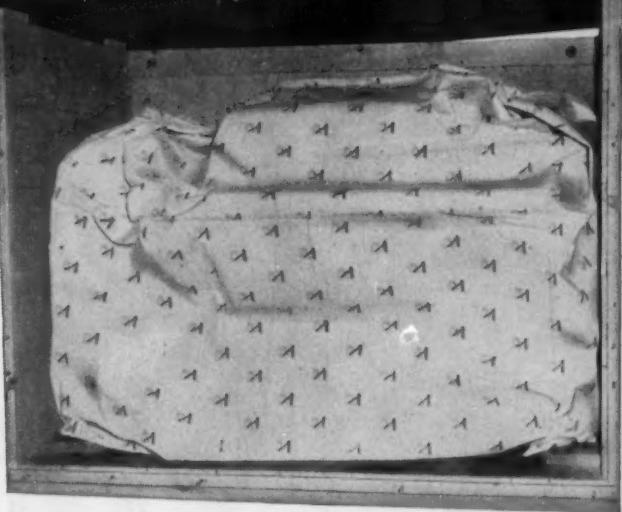
*WRITE FOR THIS  
LOGAN LATHE AND  
SHAPER CATALOG*

**LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS**

**LOGAN ENGINEERING CO.**  
4901 West Lawrence Avenue, Chicago 30, Illinois



# HOW NOX-RUST VAPOR-WRAPPER SAVES \$15,000 PER YEAR FOR A LEADING MANUFACTURER\*



Through use of an amazing new rust-preventive product... Nox-Rust Vapor-Wrapper... one of America's leading manufacturers\* estimates that it has saved over \$15,000 each year for the last two years in packaging costs alone. What's more, approximately 6,250 man-hours per year have been saved in the elimination of previous preservative packaging methods. Units now packaged in Vapor-Wrapper arrive clean, "factory-fresh," rust-free and ready for instant use. Thus, large savings in set-up time are made possible.

## INDUSTRY SWITCHES TO VAPOR-WRAPPER

Vapor-Wrapper eliminates the need for application and removal of messy, old-fashioned rust-preventive coatings. Because of this fact, leading makers of automotive and aeronautical parts and equipment as well as other vital segments of the metal-working industry have switched to Vapor-Wrapper. For details on how your firm can benefit with Vapor-Wrapper, just mail the coupon below. You'll receive full information without obligation.

\* Name on request

**CAUTION...** Only Nox-Rust makes the exclusive new Vapor-Wrapper that's impregnated with Callex... the patented VOLATILE CORROSION INHIBITOR. (U. S. Patents 2,521,311—2,534,201—other patents pending). \*

Just Mail This Coupon  
(Please attach  
to your letterhead)

**NOX-RUST**  
CHEMICAL CORPORATION  
2441 S. Halsted • Chicago 8, Illinois  
Detroit • Baltimore • Philadelphia  
San Francisco • Los Angeles

NOX-RUST Chemical Corporation  
2441 South Halsted  
Chicago 8, Illinois  
Please send me full information on how my firm can benefit  
through use of Vapor-Wrapper.

Your Name \_\_\_\_\_

Address \_\_\_\_\_ (If different from letterhead)

City \_\_\_\_\_ State \_\_\_\_\_

## Personnel

Robert M. Sellers, appointed manager, Fostoria, Ohio foundry, and Robert W. Munger, appointed manager, Mt. Vernon, Ill. foundry, ELECTRIC AUTO-LITE CO., Toledo.

William T. Harris, named assistant to the district commercial sales manager, Southern district, YORK CORP., York, Pa. Mr. Harris will have headquarters in Atlanta.

Harry E. Boynton, appointed district manager, Western Canada, Tube Turns of Canada, Ltd., subsidiary of TUBE TURNS, INC., Louisville.

B. J. A. Sturrock, appointed division tubular manager, National Supply Co., Ltd., Canadian division of NATIONAL SUPPLY CO., Pittsburgh.

Edward C. Buster, appointed factory manager, J. H. CRISTIL CO., Edgerton, Ohio.

R. P. Crawford, formerly a general foreman, inspection division, promoted to assistant chief inspector, Greenville Div., TEMPCO AIRCRAFT CORP., Dallas.

Perry G. Snyder, becomes district engineer, Youngstown district, YOUNGSTOWN SHEET & TUBE CO. He succeeds the late Ray Fenton.

## OBITUARIES

Edward William Tait, 65, manager, Fabricated Products Dept., Combustion Engineering - Superheater, Inc., New York.

William Wallace Scott, Jr., 72, vice-president in charge of sales and a director, LacLede Steel Co., St. Louis.

Russell Hunt, 71, former vice-president, Sloss-Sheffield Steel & Iron Co., Birmingham.

Henry Gerhardt Sommer, 62, manager of secondary products, Saks Div., Wheeling Steel Corp., Wheeling, W. Va.

Earl D. Power, 56, chairman of the board, Lyon Metal Products, Inc., Aurora, Ill.

Wallace Banta Phillips, 66, president, Pyrene Mfg. Co., Newark, N. J.

Chisholm Nicholson MacDonald, president, Gear Grinding Machine Co., Detroit.

# HOW DOES TITANIUM SCALE

## at high temperatures?



By P. H. Morton  
Research assistant

and



W. M. Baldwin, Jr.  
Research professor  
Dept. of Metallurgical Engineering  
Case Institute of Technology  
Cleveland

The Iron Age  
FOUNDED 1853  
Technical Articles

At 850° to 1000°C, a transition from a primary light scale to a black scale was observed with the U. S. Bureau of Mines titanium that has not been reported previously. This oxidation product was composed of five layers, and was accompanied by a change from a low scaling rate to a much higher one. Above 1000°C, behavior was more complex. Titanium from two other sources was the same in appearance and overall reactions were also similar, except that no transition occurred.

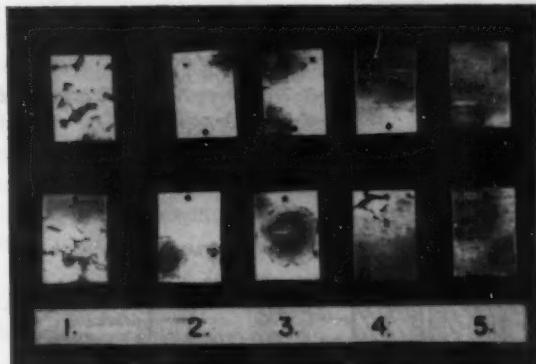


FIG. 1—Showing transition from light to dark scale on Bureau of Mines titanium at 900°C. Both sides of each specimen are shown. Patches of light scale flaked off during cooling revealing underlying metal; resulting dark areas are prominent in samples 1, 3 and 4. Dark-colored scale has more blurred outlines.

Specimen	1	2	3	4	5
Dark blue scale (visual), pct	17	16	53	77	99
Transition (by weight), pct	15	15	35	75	95
Total time, minutes	41	22	19	37	33

Scales developed on titanium in air are complex and vary with time, temperature and source of material. Material from the U. S. Bureau of Mines was studied in detail. Characteristics of this material are given in the accompanying box. A summary of existing information on the scaling of titanium in oxygen or nitrogen is given in the adjacent table.

To remove initial scale and surface layers which may have been high in iron dissolved during sheath rolling, the as-received strips were sanded with emery paper. Pickling in a 10 pct aqueous solution of hydrogen fluoride followed and then they were again abraded.

Specimens, usually 1 sq in. in size, were suspended from one arm of a magnetically damped Chainomatic chemical balance by fine

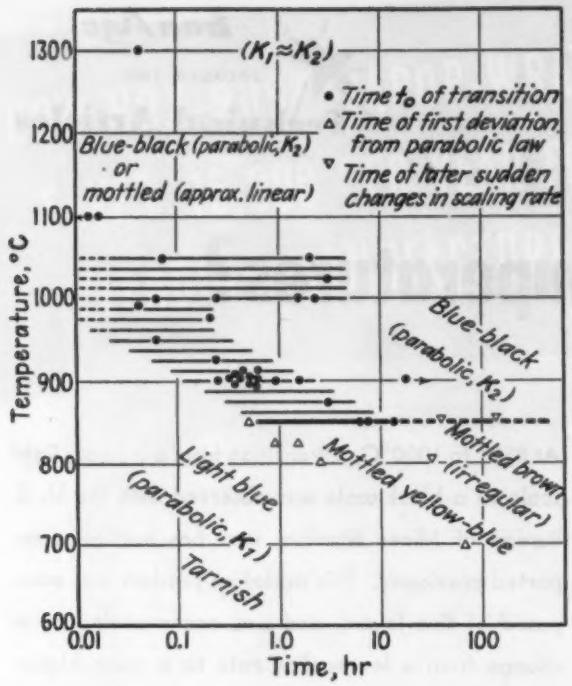


FIG. 2—Effect of time and temperature on color of scale, showing behavior in air. Color of scale is shown and the scaling law indicated in brackets. Shaded area shows transition region, which did not occur below 850°C.

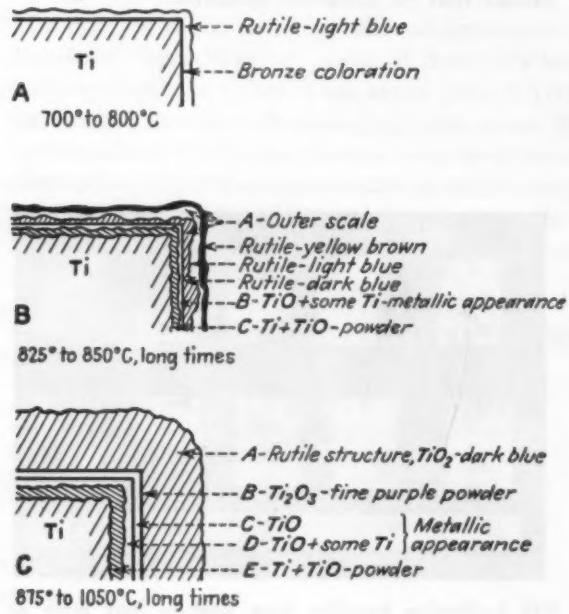


FIG. 3—Scale formation shown in cross-section, as it developed at various temperature levels.

#### Scaling of titanium (continued)

Nichrome wire into a vertical tube furnace. The weight increase was then measured as a function of time at a constant temperature.

The weighing errors were estimated to be within plus or minus 0.2 mg, or about 0.02 mg per sq cm of sample. The percentage error involved in the weight increase was therefore small where a thick scale was formed. But

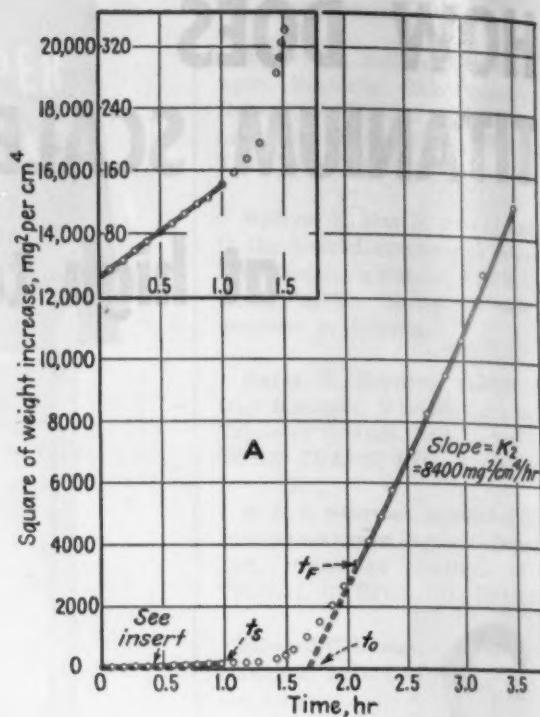
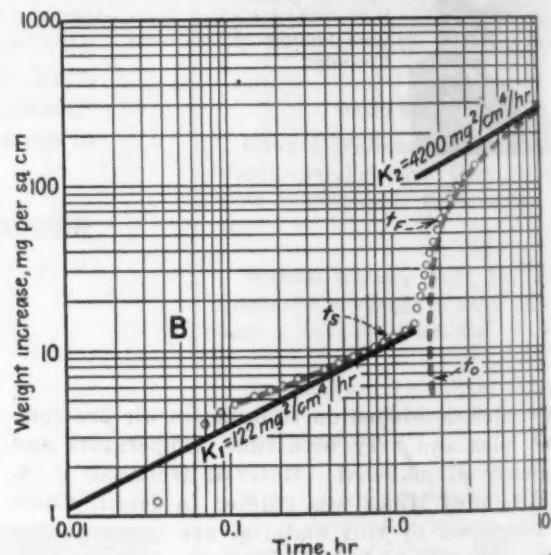


FIG. 4—The square of the weight increase of titanium scale is plotted as a function of time in "A". The same data are shown in "B", below, on a log-log scale.



when the overall weight increase was slight, at low temperatures and short times, it might have been considerable. A small error in the initial weighing might affect the shape of the oxidation curve at short times.

The temperature of the specimen in the furnace was set to within plus or minus 5°C. The variation of temperature with time was less than plus or minus 2°C—plus or minus 4°C at temperatures above 1000°C.

The times were measured from the moment of insertion in the furnace. However, the specimen did not immediately reach the temperature of the furnace. To this extent the runs were not truly isothermal.

X-ray analyses were made of scales cooled to room temperature with a General Electric XRD-3 instrument, using the spectrogoniometer head. With this equipment and the flat strip specimens, only crystallographic planes parallel to the specimen surface could cause reflections. Preferred orientations or fibering were thus revealed by abnormally intense diffraction lines or lines that were absent. Where necessary, Debye-Scherrer photographs of the scale were made.

#### The source made a difference

The difference in scaling behavior of titanium from different sources was particularly marked. Some data on these other materials are given in the paper\* on which this article is based.

\*Transactions of the American Society for Metals, 1952. This paper contains an extensive bibliography on the scaling of titanium, including both American and European references.

The Bureau of Mines material differed most markedly from 850° to 1000°C. One of the Bureau of Mines specimens held at a constant temperature in this range showed striking changes with time. Fig. 1, for example, is a photograph of a series of samples scaled at 900°C.

The transition noticeable in this photograph has not been reported previously for titanium. The primary light scale was replaced in time by a growing black scale. A similar transition has been observed in the chemically similar metal zirconium. In both cases the advent of the second scale led to a greatly accelerated rate of oxidation.

#### Black scale wells up from interior

With titanium, however, the black scale nucleated at relatively few points. It welled up from the interior of the primary scale, ultimately replacing it entirely. This was in distinct contrast with zirconium, where the second scale nucleated profusely at the exterior of the primary scale, merely covering it.

The times and temperatures at which the various scales were observed on the exterior are indicated in Fig. 2. Below 850°C in air the exterior never became black. This again is in contrast with zirconium where no lower temperature limit for the second scale's appearance was found.

Because some of the interior scales were powders it was impossible to prepare cross-sections suitable for photomicrographs. Sketches of the scale sections based on visual and binocular microscope inspection are given in Fig. 3.

Below 850°C, at short times or low tempera-

tures, the light-colored scale was light blue when thin, Fig. 3a.

At longer times, or higher temperatures, the scale gradually became mottled, took on a yellow coloration and finally turned brown. The outer scale, Fig. 3b, was primarily light blue, but with dark blue patches predominating at the interior and a fine covering of dark yellow crystals. The next change was to mottled brown.

The whole outer scale was shown by X-rays to have the structure of rutile,  $TiO_2$ . There were slight, if any, differences in diffraction line intensities between the inside and the outside. Beneath this outer scale was a bronze-colored metallic layer, separated by powder from the metal itself. X-rays showed the bronze layer to be a titanium oxide,  $TiO$ , with traces of titanium metal. The powder was mostly titanium.

Between 875° and 1050°C, a transition took place. At short times the scale was similar to that formed at 700° to 800°C. After transition, with the exterior completely black, the scales were composed of five layers, Fig. 3c.

Debye-Scherrer photographs showed the thick black exterior layer had a rutile structure. No difference could be detected, even in the faintest lines, between the X-ray pattern of this black scale and the light blue formed initially at 900°C.

Crushed black scale, formed at 925°C and 1000°C, was heated for 24 hr at 800°C in a porcelain crucible. The scale became light yellow, but the total increase in weight did not exceed 4 parts in 10,000. There was no change in the X-ray pattern. Measurements made at room temperature on the dark scale showed an electrical conductivity greater than  $2 \times 10^{-2}$  ohms $^{-1}$  cm $^{-1}$ . The light yellow-brown scale, formed by heating the black scale alone or as taken from specimens scaled at low temperatures, gave a conductivity less than  $10^{-9}$  ohms $^{-1}$  cm $^{-1}$ .

The dark layer when formed below 1000°C was composed of columnar crystals. This showed on the X-ray spectrogoniometer trace as very strong reflections from one, or at the most, two families of planes. At 1025°C and

#### DETAILS ON BUREAU OF MINES TITANIUM

Source: U. S. Bureau of Mines

Producer: U. S. Bureau of Mines

Method of reduction: Reduction of the chloride with magnesium

Forming: Powdered metal pressed, sintered, hot rolled in iron sheath at 800°C to 0.126 in. gage, warm rolled at 600°C to 0.064 in. gage.

Analysis: Typical analyses as sintered, pct: Fe, 0.15; Mg, 0.08; Si, 0.03; Mn, 0.16; Ni, 0.12; Cl, 0.03.

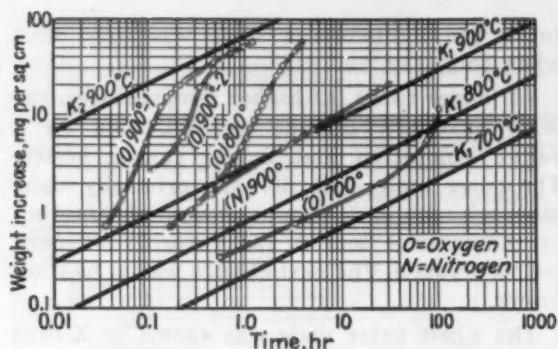


FIG. 5—Scaling behavior of titanium in both oxygen and nitrogen is shown at various temperatures.

### Scaling of titanium (continued)

#### EXISTING INFORMATION ON SCALING OF TITANIUM SUMMARIZED

Investigator*	Carpenter and Reavell	Hickman and Gulbransen	Gulbransen and Andrew	McPherson and Fontana	Davies and Birchall
Metal used	Chloride reduced by magnesium, sintered 98.7 pct Ti, 0.2 O <sub>2</sub> , balance C, Fe, Si, Al	From Metal Hydrides, Inc. 94 to 98 pct Ti	From Remington Arms Co. 99 pct Ti, 0.77 C, some Si, Fe	Du Pont sponge, 99.8 pure arc-melted under argon 0.23 pct O <sub>2</sub> , 0.05 N <sub>2</sub> , 0.01 H <sub>2</sub> , 0.09 W, some Fe, Mn	Chloride reduced by magnesium
Oxygen pressure	Initially about 140 mm hg	About 1 mm hg	76 mm hg	Still air	1 atmosphere
Temperatures up to 700°C Nature of scale		Rutile scale observed during scaling at 300°C to 700°C from 0 to 1 hr. No TiO or Ti <sub>2</sub> O <sub>3</sub> observed. Some preferred orientation at 600°C	Assumed to be Rutile		Yellow outer surface
Reaction rate			Modified parabolic law obeyed. Relatively insensitive to gas pressure. Some of data plotted in Fig. 2. Some experiments on high purity iodide titanium showed lower oxidation rate	650°C point shown in Fig. 2	Linear law after initial deviation
Temperatures 700°C to 850°C Nature of scale	740°C for 50 hr. Appearance light gray, but magnified showed as dark gray partially covered by yellow-white crystals. Measured by pressure drop, and pressure effect not known, but four points shown in Fig. 2. Behavior approximately parabolic initially but nearly linear later			730°C point shown in Fig. 2. 815°C method discontinuous. Five points shown in Fig. 2	700°C to 820°C yellow outer surface Above 820°C orange to brown color
Reaction rate					Linear law after initial deviation
Temperatures 850°C to 1000°C Nature of scale	1000°C for 10 hr. Scale 1 mm thick of white and yellow crystalline structure, inner surface near core being light blue. Dark blue surface of core was easily scraped off revealing a bright metallic surface. Specimen with worked surface, scaled for 5.5 hr at 1000°C. Scale was light gray-blue all through, with patches of white along the edges.				Up to 850°C orange to brown color outer surface
Reaction rate	Irrregular but approximately parabolic initially. In some experiments rather abrupt changes of slope of the pressure-time curves appeared. Six points shown in Fig. 2.				Up to 950°C linear law after initial deviation. Deviation lessens with increasing temperature. Approaches zero at 950°C
Nitrogen pressure Nature of scale	Initially 550 mm hg 1000°C for 10 hr. Pale bronze sheen		76 mm hg 550°C to 850°C, 2-hr runs. No TiN observed after cooling to room temperature. Nitrogen in solution in the metal		
Reaction rate	Linear law. Two points in Fig. 2				

\* See bibliography for full references.

1050°C the columnar grains were less noticeable.

The very thin purple veneer layer was so thin that X-ray analysis was difficult. However, the two strongest lines of the titanous oxide, Ti<sub>2</sub>O<sub>3</sub>, pattern were observed.

Of the next layer, which was thin, bronze and metallic, X-rays gave reflections corresponding to a sodium chloride structure, lattice parameter about  $a = 4.18\text{ \AA}$ , indicating it to be TiO. However, the lattice parameter of titanium nitride, TiN, varies with temperature and composition. So the scale may have been TiN or may have contained nitrogen in solution. The layer was smooth and straight on both external and internal boundaries. The

specimens in Fig. 1 which were in the midst of transition, had this layer adhering closely under the black blotches, but not under the light scale.

Immediately under this layer was a thin, silvery metallic layer. This was very similar to the previous, bronze-colored layer. X-rays showed  $\text{TiO}$  (or  $\text{TiN}$ ) reflections. Lattice parameter was about  $a = 4.19\text{\AA}^\circ$ . There were some weak lines corresponding to metallic titanium. On samples scaled from  $875^\circ$  to  $1000^\circ\text{C}$ , it was distinct and separate from the bronze-colored layer over it. On samples scaled at  $850^\circ\text{C}$  the two layers were too thin for distinction. The inner surface was irregular and rough.

#### **Gray powder between scale and metal core**

A considerable layer of gray metallic powder lay between the scale and the metal core of these samples. X-ray analysis yielded reflection lines of both titanium and  $TiO_2$ —or  $TiN$ .

The underlying metal always showed the alpha hexagonal structure. On specimens scaled at 1000° and 1300°C the structure observed after cooling was considerably distorted, perhaps indicating a transformed beta structure.

Above 1000°C the scales were not examined in detail. Up to 1050°C the scale was initially patchy white and blue, but it changed rapidly to the same blue-black observed between 850° and 1000°C. Two specimens at 1100°C behaved similarly, but a third one at 1100°C and one at 1200°C remained mottled with dark mounds in a light blue or yellow background. The inner layers were complex. At 1300°C the scale was blue-black as at 900° to 1000°C.

### Scales changed color

Of six samples tested at 850°C, five showed a black scale at the exterior within 10 to 20 hr. The remaining one developed a dark scale only as an irregular substrata, Fig. 3b.

Some of the scales which finally appeared light blue were green at higher temperatures. Those which were pale yellow or brown when cool were a brilliant yellow when hot. This yellow was quite distinct from the incandescent effect of high temperatures.

The normal relationship between weight increase and time does not fully apply to the curves developed below 700°C. However, after a short, initial deviation, a modified parabolic relationship is followed.

At 700°C and less, scaling rate, Fig. 5, is controlled by amount of scale over initial weight, rather than by the total weight acquired. This suggests that an initial weight increase occurs by the solution of oxygen in the metal. Further weight increase is due to scale formation, which alone sets the rate of reaction.

As the temperature increases, this initial gain in weight also increases, but its increase is less than the increase in scaling rate. For

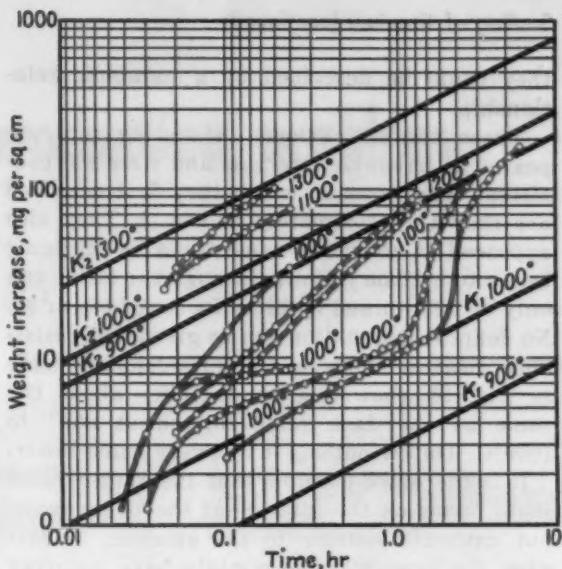


FIG. 6—Scaling behavior of titanium from 1000° to 1300°C.

that reason, the effect becomes less noticeable. At 800°C the effect is insignificant. Between 850° and 1000°C, the curves follow a straight line with a slope of 0.5 at short times. Then they suddenly swing up sharply, finally tapering off to a second straight line similarly sloped.

The square of the weight increase is plotted against time for one run at 1000°C in Fig. 4a. The two branches of the curve represent two successive parabolae. These are replotted in Fig. 4b.

Percentage of transition from the low parabolic scaling rate to the high could be estimated from weight readings taken on a specimen removed from the furnace during transition. The percentage of dark scale welling up through the light was also estimated visually. The percentages of transition measured in these two ways agreed well (see table below Fig. 1, p. 133), indicating they are measures of the same phenomenon.

Specimens 1 and 2, Fig. 1, show same percentage transition but at the widely differing times shown in the data for 900°C in Fig. 2. Despite this type of behavior at this and other given temperatures, the value of the two parabolic scaling rate constants was consistent.

This poor reproducibility in times is undoubtedly a reflection of the low nucleation rate. In zirconium, nuclei of the second scale were profuse and the transition time was highly reproducible. Work soon to be reported from this laboratory indicates that lead behaves like titanium in this respect rather than like zirconium. These facts indicate an uncertainty principle and underscore the problem's statistical nature.

Between 700° and 850°C, small jogs repeatedly interrupt curve continuity. Otherwise,

### Scaling of titanium (continued)

they could be described by a parabolic relationship.

These sudden changes in scaling rate appeared at irregular intervals and were not consistent. The times at which they first occurred are shown approximately in Fig. 2. They also appeared at about the same times as the scale began to become yellow, although the latter can only be determined within a factor of ten or so. No definite explanation can be given, but resistance measurements on the dark-colored inside in Fig. 3b showed a conductivity about the same as the dark scale formed at 850° to 1000°C. On the outside it was very much lower.

It is therefore possible that the dark-colored scale forms on the interior of the outer scale, but cannot penetrate to the exterior. Otherwise, the same transition might have occurred as was observed at 850° to 1000°C.

#### **Indiscriminate behavior at 850° C**

Behavior of titanium in air at exactly 850°C is indiscriminate. However, different partial pressures of oxygen show a very different behavior.

A few experiments were run using atmospheres other than air, Fig. 5. The runs using oxygen at atmospheric pressure gave the same type of behavior as in air, but with a slight increase in the initial scaling rate. The run using nitrogen also provided similar initial results. The scaling rate constant was slightly less than that for scaling in air at the same temperature.

From this fact and also judging by the appearance of the scale, it appears the scaling resulted from oxygen at reduced pressure, rather than from nitrogen. The gas used was commercial nitrogen passed through a drying tower into the furnace. However, some oxygen undoubtedly penetrated through the joint at the bottom of the furnace.

#### **More pressure hastened transition**

An increase in partial pressure of oxygen clearly reduced the transition time. It also lowered the temperature, 850°C in air, below which the transition did not occur. On the other hand, decrease in oxygen partial pressure greatly increased the time at which transition took place. The time at 900°C was increased from an average of 0.55 hr in air to a value greater than 26 hr using the nitrogen atmosphere.

The curves above 1000°C no longer represent a simple parabolic relationship.

The behavior of the titanium from the Bureau of Mines above 1000°C is shown in Fig. 6. An approximately sigmoidal shaped log-log curve is observed for runs at 1000° to 1050°C. Two runs at 1100°C behaved similarly. In a third run at 1100°C and in one at 1200°C an approxi-

mately linear behavior resulted together with a mottled scale. These irregularities may all be a continuation of those observed at long times at temperatures below 850°C.

At 1300°C, scaling followed a parabolic law from almost zero time.

Titanium from the National Lead Co. and a private source were also studied. At the present time only limited data is available on these additional materials.

The titanium produced by the National Lead Co. scaled in air to a white, single-layered product. This appeared homogeneous under the microscope and gave rutile diffraction lines on X-ray analysis. However, after long times at high temperatures, a black coloration began to appear on the inside of this scale. The black layer was very similar to that observed in the scaling of Bureau of Mines titanium in the 800° to 850°C range, as shown in Fig. 3b.

The titanium from a private source scaled at first to a buff, single-layered product. Again there was a black coloration on the inside, but at shorter times. In addition, the exterior took on, in time, the appearance of fused garnet sand paper.

#### **Formed by gradual darkening**

In contrast to the black on the inside, this layer seemed to form as a gradual darkening of color of the surface of the scale. When it was thick enough to be observed under a low-power microscope, it was always of uniform thickness over the whole surface. These three layers could not be distinguished from one another and they comprised a single, closely adherent scale. All showed a rutile diffraction pattern on X-ray analysis. At 900°C, the black color appeared before the garnet layer could be definitely identified. However, at 1100°C the garnet crystals appeared before the black.

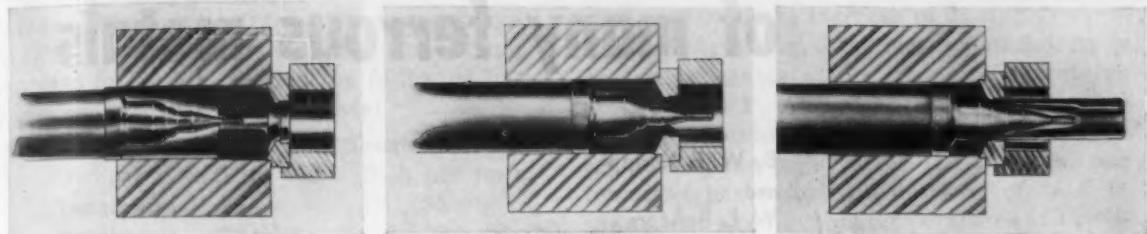
At 800°C, a parabola was obeyed initially, but with deviation at later times. At higher temperatures the deviations occurred earlier and seemed to be quite irregular. No definite correlation was made between the weight changes and the appearance of the scale, but they are probably interconnected. The electrical conductivity of the black portion of the scale was much greater at room temperature than that of the white, buff or garnet-hued scale.

The appearance of the scales on these materials was of the same general description as that on the Bureau of Mines material in the 800° to 850°C range. The overall behavior was similar except that in these two cases no transition was observed.

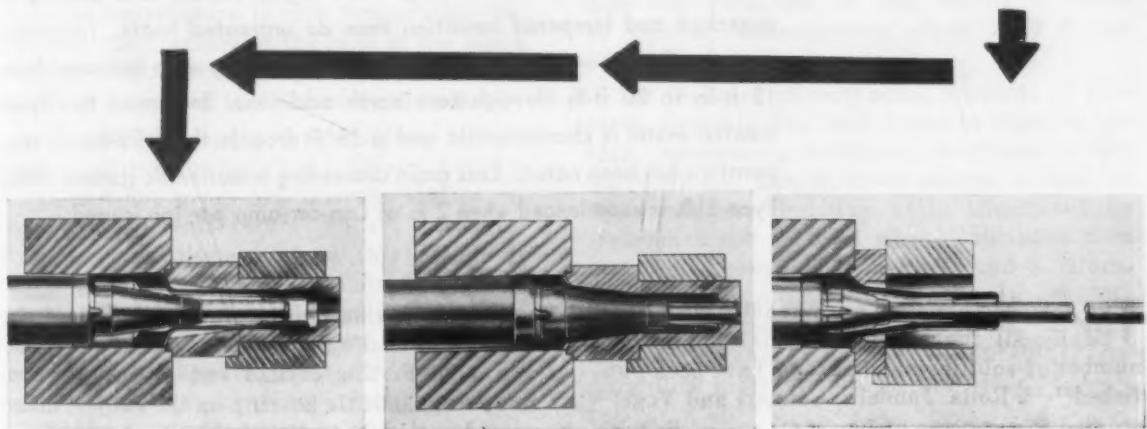
The authors wish to thank the Research Corp., New York, who sponsored this work, for permission to publish these data. Also the following persons of Case Institute of Technology: C. S. Smith, C. A. Phanikar. The authors appreciate the help of O. C. Ralston, Chief, Metallurgy Branch, U. S. Bureau of Mines, and of R. S. Stewart, Assistant Chief, Physical Metallurgy Div., Titanium Alloy Manufacturing Div., National Lead Co. The cooperation of E. A. Gulbransen and K. F. Andrew is gratefully acknowledged.

# HOT EXTRUSION

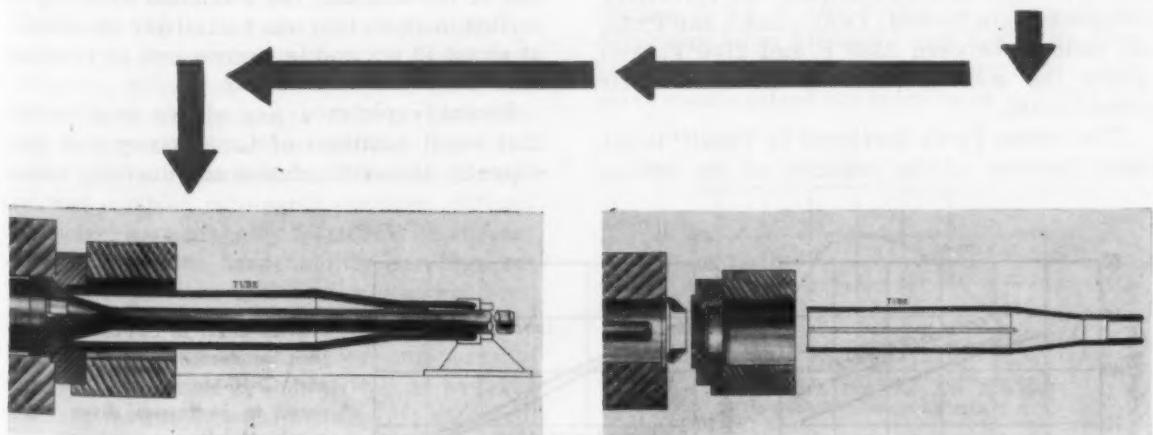
## solves production problem



PRODUCTION HEADACHES connected with welded edge fabrication of hollow steel propellers led Curtiss-Wright Corp. with Air Materiel Command to develop steel hot extrusion process for making hollow propeller blanks. Here, in first step, left, mandrel pushes billet through container and up against die where it is ready for extrusion. In next step center, billet backs extrude over mandrel and starts out through die. Blade's shank section, right, gets tapered wall thickness from shape of mandrel. Extrusion is done on big, 5500-ton hydraulic press.



TRANSITION SECTION between shank and airfoil portion of blade, left and center, gets tapered form when it is pressed between tapered mandrel and die. Billet is reheated in salt bath before start of next step right. Then external die and container are closed prior to final extrusion with tapered mandrel inserted in fast growing propeller blank.



SEAMLESS tapered wall tube is formed as the hot metal flows between mandrel and die, left. Right, remnant is trimmed off and finished extrusion removed from die. Blank is cooled, stress relieved before further finishing operations.

A little does it—

# RARE EARTHS IMPROVE PROPERTIES

## of many ferrous metals

By W. E. Knapp

and

W. L. Bulkcom

American Metallurgical Products Co.  
Pittsburgh, Pa.

### Part II

Lan-cer-amp treated steel castings show higher impact and ductility in quenched and tempered condition than do untreated heats. Transverse impact values at  $-40^{\circ}\text{F}$  on 0.32C Cr-Ni-Mo forgings were increased from 12 ft-lb to 20 ft-lb through rare earth additions. Increased fluidity of treated metal is characteristic and a  $35^{\circ}\text{F}$  drop in the solid-liquids temperature has been noted. Less grain coarsening in austenitic stainless steels, Type 310, is experienced when 2 lb of Lan-cer-amp per ton is used.

The rare earth metals alloy readily with practically all the common metals and a large number of equilibrium diagrams have been published<sup>21, 22</sup>. Rolla, Jandelli, Canneri and Vogel<sup>23</sup> studied the systems of La, of Ce and of Pr with Ag, Cu, Au, Al, Ti, Pb and Sn. The diagrams for each of these three rare earth elements with any one of the base metals are remarkably similar. In the case of Al, Au, Pb and Sn, very refractory compounds are formed; CeAl<sub>2</sub>, LaAl<sub>2</sub> and PrAl<sub>2</sub> all melt at between  $2550^{\circ}\text{F}$  and  $2700^{\circ}\text{F}$ , well above the melting point of either of their constituents.

The system Fe-Ce developed by Vogel<sup>24</sup> is not exact because of the impurity of the cerium

used. It contains two intermetallic compounds, CeFe<sub>2</sub> and Ce<sub>2</sub>Fe<sub>5</sub>, with a eutectic at 4.5 pct Fe and  $1175^{\circ}\text{F}$ . The cerium end of the diagram, however, has little bearing on the subject under consideration here although it is important in the lighter-flint industry where iron is added to misch metal to confer greater hardness, stability and sparking characteristics. On the iron end of the diagram, the maximum solubility of cerium in alpha iron was tentatively established at about 12 pct and in gamma iron at 15 pct at  $2000^{\circ}\text{F}$ .

Recent experience has shown conclusively that small additions of Lan-cer-amp give consistently higher toughness and ductility values

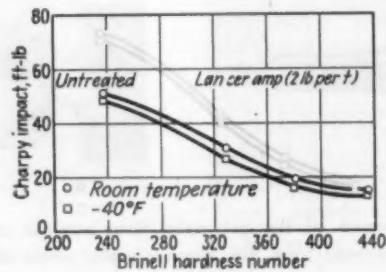
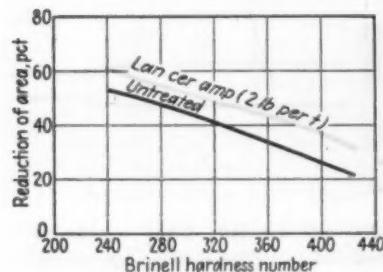


FIG. 2—Effect of Lan-cer-amp additions on ductility and toughness of cast Cr-Ni-Mo quenched and tempered to hardnesses shown in the graphs at left.

in steels quenched and tempered to a given hardness level. Fig. 2 plotted from data of a 0.25C Cr-Ni-Mo composition produced as castings in a basic open hearth shop illustrates these effects.<sup>16</sup>

Improved low-temperature impact strengths are of added importance since they are a measure of susceptibility to notch sensitivity and shock resistance. Lan-cer-amp has increased the -40°F V-notch impact values of a wide variety of low alloy steels by over 50 pct. In one instance, transverse -40°F V-notch values for 0.32C Cr-Ni-Mo forgings, quenched and tempered to 400 Bhn were raised from an average of 12 ft-lb to 20 ft-lb. Cr-Ni bars, quenched and tempered to 250 Bhn showed the following improvement in -40°F V-notch tests:

	Untreated (ft-lb)	Treated (ft-lb) (2 lb per ton)
Longitudinal	56	85
Transverse	36	55

#### Transition temperature lowered

In this particular case it was found that the addition lowers the impact transition temperature from about -150°F to about -250°F. The transition temperature is that temperature below which the fracture at the base of the notch changes from fibrous to granular, occurring usually at an impact level of 10 to 12 ft-lb.

It is generally conceded that, other factors being equal, low oxygen, low nitrogen, low hydrogen and fine grain are instrumental in increasing low temperature impact strength. From previous discussions in this article it should be evident that all of these conditions may be induced in steel through Lan-cer-amp additions in the absence of strong nitrogen fixers. Since nickel has long been advocated as an agent for increasing low temperature toughness, it should be pointed out that an addition of 2 lb per ton of Lan-cer-amp is as effective in this regard as 2 pct Ni.

#### Hardenability increases

Tawara<sup>25</sup> has stated that hardenability increases with increasing rare earth metal content up to a definite maximum, beyond which the reverse is true. It appears that in both this study the amount of rare earth metals dissolved in the austenite must have been significant; also that complex rare earth carbides, difficult to dissolve, were probably formed. With current practice, increased hardenability has been reported but sufficient data have not as yet been compiled to offer any quantitative information.

The beneficial effects of Lan-cer-amp just discussed are imparted to cast as well as wrought steels. In fact, additional benefits are obtained. The use of Lan-cer-amp improves metal fluidity, as measured by the spiral fluidity test casting<sup>16</sup>. See Fig. 3. At the lower pouring temperatures of

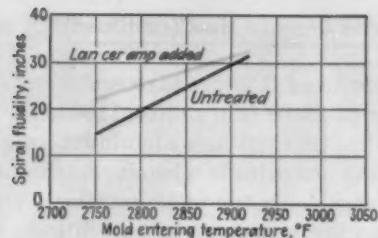


FIG. 3—Fluidity of intermediate manganese steel. Courtesy, American Steel Foundries Co.

around 2800°F the increase in fluidity is about 25 pct. Note in Fig. 3 the increase in fluidity is not as noticeable at the higher temperatures around 3000°F. Although some operators attribute the enhanced fluidity to lower oxygen content of the metal after the addition, one foundry<sup>16</sup> has reported a decrease of 35°F in the solidus and liquidus temperatures of Cr-Ni-Mo castings after a Lan-cer-amp addition of 2 lb per ton.

A reduction in hot tearing has also been reported from information obtained on a specially designed hot tear test casting. In this case the reduction in hot tearing is noted at pouring temperatures above 2850°F, see Fig. 4.<sup>16</sup>

The presence of very small amounts of rare earth elements has been found to improve the high temperature oxidation resistance of Cr-Ni-Fe, Cr-Fe, and Fe-Cr-Al alloys, as well as Cr-Ni alloys. This was aptly illustrated by Hessenbruch,<sup>26</sup> some of whose data have been interpreted graphically in Fig. 5 and 6. "Durability" shown in these curves represents the life of wire specimens 0.4 mm (0.016 in.) in diam at 1925°F. The "coefficient of durability" or durability index is an arbitrary value 15 times the "durability."

Fig. 5 illustrates the effect of less than 1 pct of contained cerium (combined rare earth metals), thorium, calcium, aluminum, silicon, vanadium and titanium on an iron alloy containing 35 pct Ni and 20 pct Cr. Although the durability index (1925°F) was 1100 (life span 75 hrs), alloying with 0.11 pct contained rare earth metals raised the index value to 5200 (life

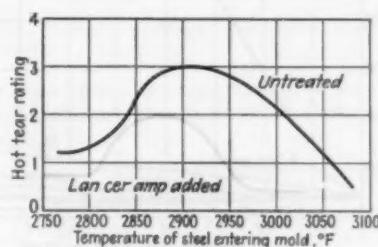


FIG. 4—Occurrence of hot tears in grade B steel castings containing 0.035 pct S with and without Lan-cer-amp additions. Courtesy, American Steel Foundries Co.

### Rare earths improve steel (continued)

of 250 hrs) and 0.39 pct rare earth metals gave an index of 19500 (durability, 1100 hrs).

Calcium, thorium and aluminum, in order of decreasing magnitude also increase the durability index, but none to so extremely marked a degree as the rare earth group. Silicon, under 1 pct, had little or no effect and titanium and vanadium decreased the durability. Fig. 6 shows a comparable effect in an alloy of 30 pct Cr, 5 pct Al, balance iron.

The explanation of increased oxidation resistance as imparted by the rare earth metals is that their atomic volume is greater than the molecular volume of the oxide of the parent metal, hence they limit the rate of diffusion of the latter, acting somewhat as the gravel in concrete, making the metal denser and resisting the passage of oxygen. Horn<sup>27</sup> tested the effect of additions of various elements, including misch metal, on nickel and Cr-Ni alloys and found that resistance to oxidation is increased in proportion to the atomic volume of the added metal, the nature of the oxide formed and the rapidity of its formation. The comparison of the atomic volumes of various elements is shown in Table VI.

#### Some scale thinner

With regard to oxidation resistance, the writers have noted, although the point is not yet well established, that when treated and untreated constructional alloy steels are heated side by side, the former seems to scale more slowly and form a thinner, more closely adhering scale.

Another effect of rare earth metals in stainless steel is an increase in hot working characteristics, resulting in better yields, particularly in more complex grades. Post, Schoffstall and Beaver<sup>28</sup> have recently given details of such benefits, as conferred upon austenitic or partially austenitic steels, with addition of from 2 to 12 lb per ton of misch metal.

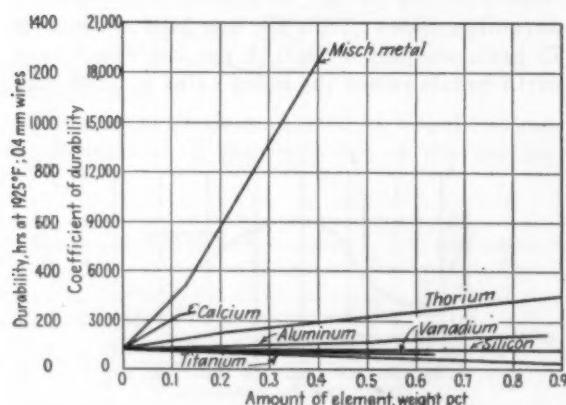


FIG. 5—Influence of various alloys or misch metal on the oxidation resistance of 35 pct Ni, 20 pct Cr, 45 pct Fe alloy. Source, Hessenbruch.

TABLE VI.  
ATOMIC VOLUMES

Element	(CM <sup>3</sup> /gm atom)
Be.....	4.96
Fe.....	7.10
Cu.....	7.11
Mn.....	7.4
Mo.....	9.4
W.....	9.53
Al.....	9.99
Au.....	10.22
Tl.....	10.6
Si.....	11.7
Zr.....	14.32
Sm.....	19.4
Ce.....	20.3
Pr.....	20.5
Nd.....	20.5
La.....	22.6
Ca.....	25.88

Although the above paper was concerned only with austenitic steels, the writers have had experience with straight chromium ferritic grades of stainless, Type 446, in which 2½ lb per ton of Lan-cer-amp increased shipped yields by 15 pct.

Lan-cer-amp has been quite effective in the prevention of grain coarsening in austenitic stainless steels. Fig. 7 illustrates the resistance of ½ in. bars of Type 310 to grain coarsening when treated with 2 lb per ton.

Lan-cer-amp used in quantities of 1 lb per ton or less definitely improves the working characteristics and, consequently, yields of high speed steel by 5 to 10 pct. The grain size of treated tool steels is finer. As an example, the Schneider-Graff grain size of high speed hack saw blades (specification: No. 14 minimum) has been raised from an average value of 16 in untreated steel to 24 to 26 in treated material.

Another rather specialized application has been in an air-hardening alloy containing 7.0 pct Mo, 3.0 pct Ni, 3.0 pct Cr, 0.60 pct C, 0.40 pct Mn, 0.25 pct Si and 0.50 pct Boron and produced in a basic electric furnace. Originally it was necessary to cast the material to shape because of its extreme hot shortness. With addition of 4 lb per ton of Lan-cer-amp the alloy,

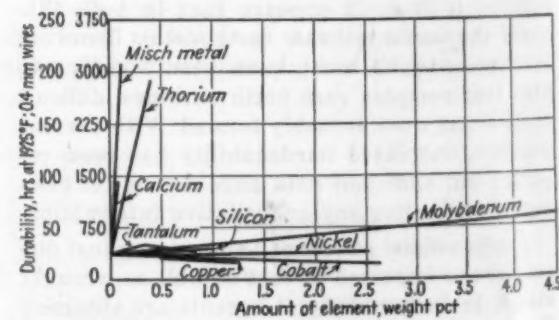


FIG. 6—Influence of various alloys or misch metal on the oxidation resistance of 30 pct Cr, 5 pct Al alloy. Source, Hessenbruch, ref. No. 26.

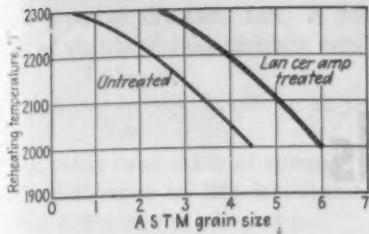


FIG. 7—Effect of Lan-cer-amp on grain size of type 310 stainless reheated at temperatures for 1 hr.

after forging, rolled easily into 7/16 in. rod. It was then coiled with yields comparable to 18-8. Fig. 8 shows a short piece of the rod in the as-coiled condition. Despite the extremely high boron content, note the normal grain size and homogeneous microstructure in Fig. 9.

Lan-cer-amp additions have also increased the semi finished-slab yield in high silicon electrical grade steels particularly on very wide sheets and have permitted rolling up to 2½ pct Si sheets in widths 12 to 24 in. greater than previously possible. The total core loss (Epstein test) of experimental sheets was reduced from 1.25 to 1.0 watts per lb at 60 cycles by additions of 2 lb per ton. The use of rare earth metals in electrical grade steels having unusually low total watt losses was first proposed by Rohn and Hessenbruch in United States Patent No. 2144200.

One of the reasons that the rare earth metals have remained dormant so long is that the proper conditions necessary for successful use were not known or observed. The writers have found that Lan-cer-amp is most effective when the heat has been made under strongly oxidizing conditions and, in basic electric practice with minimum time under the reducing slag. Further, it is much simpler to make the correct addition in basic openhearth steels than under the conditions prevailing in the basic electric process.

In stainless steels the practice of re-ladling provides a greater improvement in properties with smaller additions than when a single ladle is used. The Lan-cer-amp should be added in the second ladle and a fluid, strongly basic synthetic slag used for covering.

In basic openhearth steels the most important

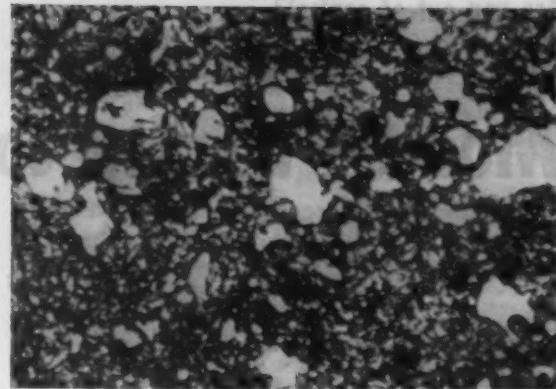


FIG. 9—Microstructure of the bar shown in Fig. 8.

features of good addition practice are: a sizable carbon drop of at least 40 points, a short block not over 30 mm, 0.20 pct min Si in the furnace at tap, and a high lime-silica ratio, particularly on the ladle, after the Lan-cer-amp has been added.

When all the conditions are favorable, 1½ to 2 lb per ton will give greatly improved impact and reduction of area values. In most stainless steels the best results can be obtained from 2 to 3½ lb per ton.

There can be no doubt that an old material has found a new and important place in steel making. We have no over-all theories to advance as to why the rare earth metals favorably affect so many divergent properties. The ideas presented here are merely offered as a summary of the problem in the hope that they may serve as an incentive for increased development.

#### Acknowledgment

The authors wish to express sincere appreciation to Mr. G. A. Lillieqvist, Research Director of the American Steel Foundries for his cooperation and the generosity of his company in permitting the use of their data on cast steels.

Part I of this article appeared on p. 129 of last week's Iron Age.

#### References

- <sup>21</sup> Hansen, M., "Der Aufbau Der Zweistafflegierungen," Julius Springer, Berlin, 1936.
- <sup>22</sup> Janecke, E., "Kurzgefasstes Handbuch aller Legierungen," Otto Spamer, Leipzig, 1937.
- <sup>23</sup> Rolla, Jandelli, Canneri and Vogel, "Contributions to the Knowledge of the Metals and Alloys of the Rare Earths," *Zeit. Metallkunde*, 35, p. 29-42 (1943).
- <sup>24</sup> Vogel, R., "Cerium-Iron Alloys," *Zeit. anorg. allgem. Chem.* 99, p. 25, (1917).
- <sup>25</sup> Tawara, Sinzi, "Effects of Various Elements on the Hardening of Steel," III, *Tetsu-to-Hagane*, 25, p. 648-657, (1939); *Japan J. Eng.* 19, p. 113, (1940).
- <sup>26</sup> Hessenbruch, W., "Metalle und Legierungen fuer Hohe Temperaturen," Julius Springer, Berlin, 1940.
- <sup>27</sup> Horne, L., "The Effect of Addition Elements on the Oxidation of Nickel and Chromium-Nickel Alloys," *Zeit. Metallkunde*, 40, p. 73-6, (Feb. 1949).
- <sup>28</sup> Post, C. B., D. G. Schoffstall, and H. O. Beaver, *Jl. of Metals*, 3, 973-977B, Nov., 1951.

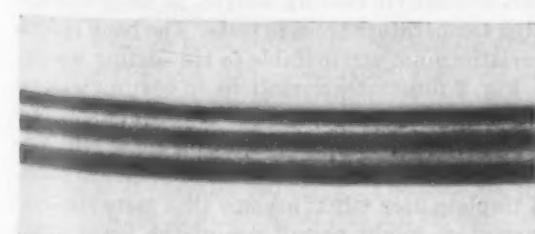


FIG. 8—Surface condition of 7/16 in. rod of following analysis: 7.0 pct Mo, 3.0 pct Ni, 3.0 pct Cr, 0.60 pct C, 0.40 pct Mn, 0.25 pct Si and 0.50 pct B.

Are you out of control? —

# Modern quality controls



By H. F. Myers

Metallurgy and Inspection Dept.  
Columbia-Geneva Div.  
United States Steel Co.  
Pittsburg, Calif.

ARE  
SIMPLE  
TO USE

Statistical methods have evolved into simple, helpful quality control tools. They help businessmen produce an item or service of acceptable quality at a profit. Control charts point out quality levels, indicate impending trouble which may mean more rejects, give a factual basis for establishing or altering specifications. Modern control systems are easy to use.

**M**odern quality control uses some statistical methods converted from theoretical mathematics to practical working tools. These statistical tools can be widely used to advantage in many plants. In spite of their mathematical background, such tools need not be complex or confusing.

"Control" as we use it means knowledge of when processes require corrective action. It implies taking, or not taking, action aimed at preventing defects. A process is in control, when we know what the quality level is and within what limits it may vary. A function of statistics in quality control is to fix limits within which we can project anticipated performance.

The purpose of quality control in a business is to assist in producing or supplying an item with acceptable qualities at a profit. "Acceptable" implies whether or not the item can be used for its intended purpose.

For control we must have a measure and reduce the measurement to a number. Two basic properties for this purpose are those continuously variable and those with a few fixed values. A nut and bolt assembly has two values: The bolt has a nut or it does not. Measurement in this case, consists of counting the occurrences of each type. The first type is a measure by variables and the second a measure by attributes. Both can be reduced to numbers and possess statistical properties which can be used for control purposes.

Cost is an integral part of a specification. A specification is a compromise between the benefit a consumer would obtain from a given increase in quality and the cost of obtaining that increment. The producer finds production costs increase rapidly as he approaches 100 per cent compliance with the consumer's desire. At some point, production costs attain such a level the consumer cannot afford to use the product as intended.

Take the case of a can manufacturer using hot dip coated tinplate for containers of a food pack. An important property of the finished food pack is length of shelf life. This decides whether the packer can put up a large pack in bumper crop years, or must restrict packing to what can be sold before the next season.

A factor governing can life is tin coating weight. Fig. 1 shows the relationship between pack life time (time to loss of vacuum in the can) and average tin coating weight, as determined in high temperature storage tests. The band reflects variations not attributable to tin coating weight.

Fig. 2 illustrates variations in coating weights on sheets of the same grade. A considerable percentage of the sheets of common cokes will contain more tin than some sheets of standard cokes. A tinplate user might assume that more rigorous inspection might permit use of the lower grade tinplate, common cokes, in place of standard cokes.

Let's assume shelf life is determined solely by

average tin coating weight and that pack life ends when 1 pct of the cans fail. A pack using cans made of standard coke tinplate would be expected to last.

$\frac{1.01}{.90} \times 100$  or 12 pct longer

than a pack using cans made of common coke tinplate. This difference in life is obtainable at a tinplate cost difference of about 3 pct.

Now, suppose the can maker insists all sheets of common coke tinplate carry at least 1.01 lb per base box of tin, thus increasing expected pack life. Using present production equipment, the sheets would require 100 pct non-destructive inspection to discard sheets carrying less than 1.01 lb per base box. Inspection costs would be at least five times the total cost of the tinplate.

By changing to tinplate costing 3 pct more, a packer will obtain an increase of 12 pct in can pack life. For about the same increase in pack life obtained by specifying a closer coating weight tolerance, the cost would be increased about 500 pct.

An early concept of quality control was to find out what the customer wanted, then try to make parts identical with the sample. This is not possible. If measurements are sufficiently discriminating we will detect differences. Over a large number of values we obtain a distribution curve similar to those in Fig. 2. This is not true of all individual measurements. If we measure a sample of finished wire diameter, Fig. 3, after each 100 lb of wire had been drawn through a given die, the successive measurements would result in the type curve shown.

#### Charts point need for action

The control chart, pioneered by Dr. W. A. Shewhart of the Bell Telephone Laboratories around 1925, does several things:

- (1) It tells, by sample inspection, that average quality level is or is not consistent with the level required.
- (2) It indicates the start of deviations, often predicting trouble before the increase in rejects occurs.
- (3) It tells the probable dispersion of properties in tested and untested output.
- (4) It provides a better basis for establishing or altering specifications.

Control charts require action when a point out of control occurs for unusually high as well as low quality indications.

Fig. 4 shows a control chart for tinplate sheet weight for which AISI tolerances are  $\pm 10$  pct for single sheets. The statistically equivalent limits of  $\pm 5$  pct for averages of 4 sheets are shown with the upper and lower control limits of the process as it operates naturally. The data are the result of a check weighing of one sample per 2 hr.

The control chart shows good conformance to the commercial tolerance. In this case it is a check rather than a control since the electrolytic

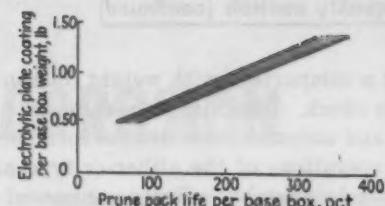


FIG. 1—Relationship between prune pack life and tin coating weight is shown above. Test pack life is expressed in percent of packing control lot life for 0.50 lb per base box. Band reflects variations not attributable to coating weight.

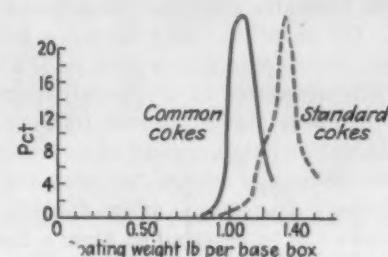


FIG. 2—Variations in coating weights on sheets of common and standard cokes are shown in the curves.

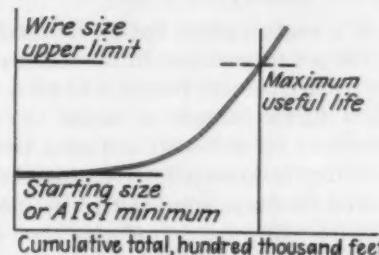


FIG. 3—Curve shows wire drawing die performance. Die was frequently replaced before reaching point of maximum useful life for scheduling or appearance reasons. Die was polished or dressed to next size before reuse.

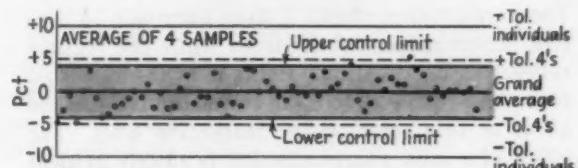


FIG. 4—Deviations from theoretical weight for tinplate are shown in control chart. Averages of 4 samples are shown with upper and lower control limits of  $\pm 5$  pct. AISI tolerances for single sheets are  $\pm 10$  pct. Sample was taken every 2 hr.

tinning line operates with continuous gages that automatically throw out sheets deviating more than  $\pm 10$  pct from the standard setting.

The line produces over 30,000 sheets in a 2-hr period, yet a sampling rate of one sheet per 2 hr used in control chart form verifies the process control is adequate. Weighing of every bundle of 1120 or 1344 sheets a few minutes after produc-

tion, and a comparison with weight tolerances, is a further check. Weighing is a composite check on gage and automatic counter performance.

Many operations of the either-or type are not measurable by variables. Parts are passed or rejected, fit a go no-go gage, contain a certain defect or do not. Control charts, applicable to this type of operation require more measurements for the same accuracy of control.

In some operations or products, the article is not necessarily rejectable for some defects and is for others. Consider the simple case of one characteristic for rejection, such as gage on a go no-go basis, or the presence or absence of a lap on a rod. In this inspection by attributes, results are reported in defects per shift or per 1000 coils, etc.

Once inspection data are reduced to percent defective the value can be treated with the total number inspected as pure numbers for which the control limits can be determined from a fixed set of tables regardless of the process. Upper and lower control limits so determined define the limits between which chance alone can cause the results to vary.

#### Can measure quality by crews

Fig. 5 is a control chart for percent defective based on 100 pct inspection. In the top curve the points plotted are percent for the 8 hr turn. Since the various turns contain a range of carbon grades produced for different end uses, considerable variability is expected. Operators have always claimed that laps were caused by incoming billet condition which partly reflected open hearth practices. If true, then by grouping the data in large lots we should obtain a constant effect of steel quality from crew to crew operating the same mill on the same range of product grade.

The lower of the two curves shows the effect of combining the information for four consecutive turns rolling with the same general mill setup. The performance shows a close approach to control. Point marked A occurred while the regular roller was on vacation. Point B is the result of four consecutive 12 to 8 am turns and reflects the effect of this shift on the inspection level. The effect of a crew reorganization is clearly evident in both the single turn and grouped data.

Sometimes 100 pct inspection is used and is not replaced by reduced sample inspection because of additional information obtained. Such a case is hardness testing of tinplate coils after temper rolling. This practice permits an every coil check which will detect accidental mixing of steel grades. This check is important because of difference in corrosion resistance of various steels and the high cost of pack failures.

The control chart method is useful in searching for the causes of variability in a process that is too complex to handle by other usual techniques. Fig. 6 represents the analysis of the basic data

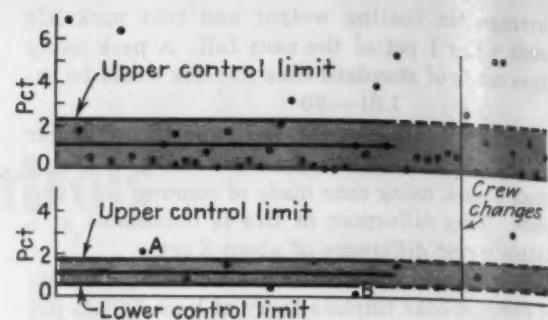


FIG. 5—Percent of laps in small rods for crew No. 3. Upper chart shows percent of laps by turns; lower chart shows percent of laps by groups of four turns.

from which Fig. 5 was developed. The 3 months' data for the occurrence of laps in certain rod sizes reflected considerable variability. This the crews were inclined to lay to the quality of incoming billets.

Inspection data on incoming billets could neither support nor deny this claim. A detailed analysis by crews was prepared by constructing control charts. Grouping data in units of four turns per crew, four control charts were developed. Since 4 turns of grouped data on these rod sizes represent 900 tons of finished steel the variability of steel input is minimized. This makes it easier to show up any other variables of major magnitude.

The four control charts show crew 3 significantly better than other crews as regards total percent laps and the state of control. Control limits for crew 4 were set up on the basis of the over-

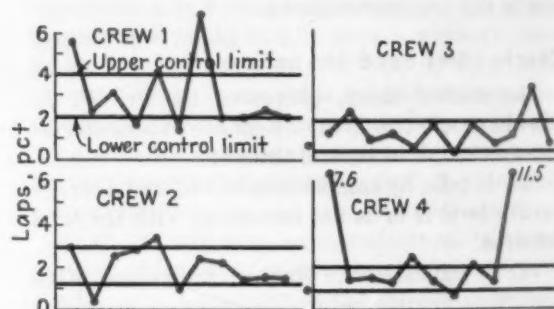


FIG. 6—Breakdown by crews was used to locate causes of poor quality. Crew No. 3 has sustained good performance.

all average crew performance and on the average of all except the first and last groups.

The chart for the latter indicates half the laps should be within the crew's ability to control. Occurrence of points far out of control indicate factors beyond the crew's control.

If gains from improved control would support the cost, continued investigation might relate defects to roll and pass change timing, mill delays, billet heating and steel grade. Since most rejected coils can be salvaged, the limited savings might not justify attempts to reduce the level below the 50 pct reduction suggested as possible.

Foil it—

## Aluminum foil STOPS CORROSION

A new method for sealing vehicles for storage and shipment to exclude water has been successfully developed and tested during the past 4 yr at Letterkenny Ordnance Depot, Chambersburg, Pa. A bituminous mastic compound, aluminum foil and an aluminum paint are used. The method has been adopted for use by the Ordnance Corps.

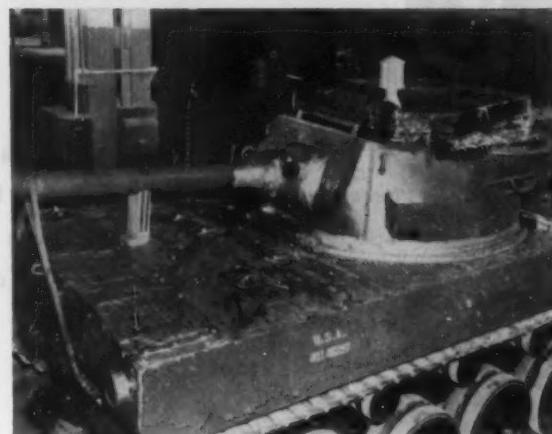
Formerly shellac, tape and mastic were used to seal the average vehicle. Continuous inspection and reworking in the field was required. After 4 to 8 months exposure the closure materials required reworking to exclude free water from interior compartments and to prevent rust, rot and corrosion.

Representative vehicles, including medium tanks, shop trucks, armored cars, half tracks and landing vehicles were sealed, using the bituminous mastic and aluminum sheet foil. A top coating of an aluminum paint containing asbestos fibre was applied.

Temperature and humidity instruments were installed in several vehicles and readings taken periodically. Inspections disclosed no free water was entering the vehicles. The problem of moisture present in the vehicle when it was sealed remained, however. Condensation and evaporation during climatic changes also presented a problem.

The theory of ventilating the vehicles was developed using drain plug openings and the installation of a ventilator adapted to the periscope opening of hull type vehicles. In December 1948 the first ventilator of the type now prescribed for use in the processing instructions was installed on several vehicles.

Inspections over an 8-month period showed no free water or condensation inside the ve-



MEDIUM TANK sealed and ready for storage shows application of aluminum foil over vents and ports.

hicles. Condition of the foil seals was excellent.

The adhesive mastic is applied around openings or parts to be sealed. Only sufficient mastic is applied to provide an adequate seal. The mastic is given about 10 min to become tacky before the aluminum foil is applied.

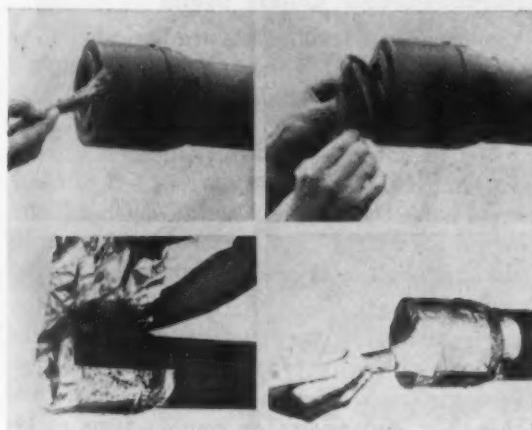
Aluminum foil bridges seams, gaps and crevices around hatch covers or other openings and readily conforms to vehicle or parts. The foil is firmly imbedded in the adhesive mastic. Sharp projections likely to cause punctures are covered with additional thicknesses of foil prior to sealing. Wide spans or gaps are not bridged but the foil conforms to the surface contour. Edges of the foil do not extend beyond the mastic coating. To avoid trapping air bubbles the foil is smoothed over with the hand or a small wooden or rubber roller. Aluminum paint is brushed on liberally over the aluminum foil.

Ventilators and adaptors used on tank and tank-like vehicles in storage are installed in the periscope opening at the highest point of the vehicle. Prior to installation of the ventilator and adaptor, periscope and components are removed and placed inside the vehicle.

On vehicles having open type turrets an opening is made in the wooden covers sufficient to insert the base of the adaptor. The adaptor should be installed prior to sealing the top of the turret.

Interior compartments of vehicles being prepared for export shipment are protected by using desiccants. Foil seals on vehicles for export are painted with lusterless OD paint.

Materials used in the sealing operation are applied directly to the metal. Loose dirt and paint scale are removed with a brush or by wiping. Grease or oil is removed with dry cleaning solvent.



APPLICATION of mastic, foil, and aluminum paint over muzzle end of gun tube is demonstrated. At upper right, bore opening is closed with foil backed by corrugated paper.



By John E. Hyler  
John E. Hyler & Associates  
Peoria, Ill.

Second of a series.

# How to get the most from

**Indexing fixtures,  
arbor accessories, cam milling attachments**

A wide range of indexing fixtures and attachments greatly increases the types of work which can be done on milling machines. Special attachments make possible cam milling and grinding. Rocking and oscillating fixtures are available for milling wedge-shaped or other irregular cuts.

MULTIPLE indexing centers take care of more than one piece of work at a time, used with two or more identical cutters mounted on a milling machine arbor at proper spacing. These are used primarily for long-run milling operations on duplicate pieces. One such device has three spindles mounted in one headstock, rotated or clamped as one. Thus, machining time is cut to almost one-third, yet the high degree of accuracy required for indexing operations is maintained. Footstock centers in such a layout are individually operated to facilitate loading, though all three centers are mounted in a single body to insure permanent alignment.

Special multiple indexing centers have occasionally been put into use. Incorporation of collets makes them adaptable for holding small-diameter work. Another device has triple indexing centers of adjustable-angle type. This is used on a universal milling machine in connection with a dividing head. The centers may be set in a straight line for straight milling. Or they can be arranged at any angle up to  $17\frac{1}{2}$ ° right or left, to compensate for swiveling the milling machine table for spiral milling.

Indexing facilities for the milling machine include chucking and indexing fixtures of different kinds. Some are provided with two different bolting bases for attaching to the milling machine table. Either of the two bases may be used. The bases are exactly 90° apart, arranged so that one holds the axis of the chuck horizontal and the other vertical.

The device has a 24-notch master index plate, used in all indexing setups, but different masking plates are provided for selective use. Thus, selected notches are masked to prevent the index plunger from entering. The attachment will provide 2, 3, 4, 6, 8, 12, or 24 divisions. The chuck may be removed and a face plate applied instead, or, a setup involving a face plate and draw-in

collet combination may be used. With various attachments and accessories the device may be employed for milling, drilling, grinding, jig boring, and slotting, on a milling machine.

One collet indexing fixture may be regarded essentially as a standard lathe collet, arranged to hold cylindrical workpieces with their axes in a vertical plane. It is designed to provide ability to index any number of positions from 2 to 25. In most cases, these fixtures are provided with a simple handle at the side, which may be moved up or down to open or close the collet. The collet has no vertical action when closing.

A pipe tap hole in the side of the fixture allows cutting oil to be run through to the work under pressure. This lubricates the cutting tools, and also washes chips out of the fixture. Blasts of air may be used to remove workpieces from this fixture if desired. There are also special work-holding fixtures of collet type arranged for operation by air cylinder.

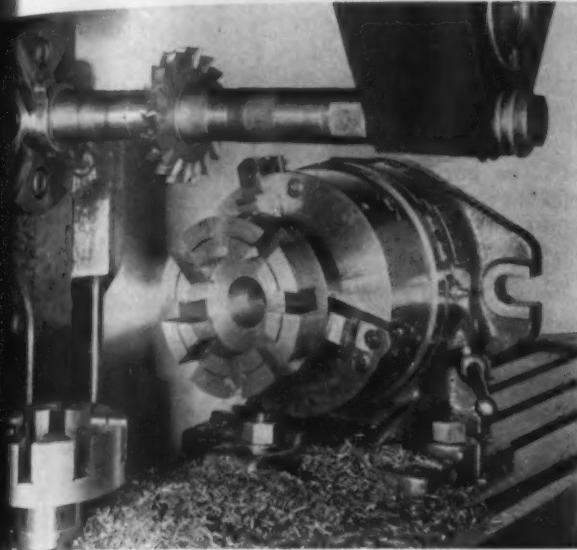
## Interchangeable collets useful

Some collet indexing tools are basically ratchet indexing fixtures. These are chiefly employed for holding short cylindrical pieces with their axes vertical. However, the fixtures can be arranged in a horizontal position. This makes it possible to hold and mill long rods on their ends, and to index them. Workpieces are held by interchangeable collets, and various shapes may be held through use of special collets.

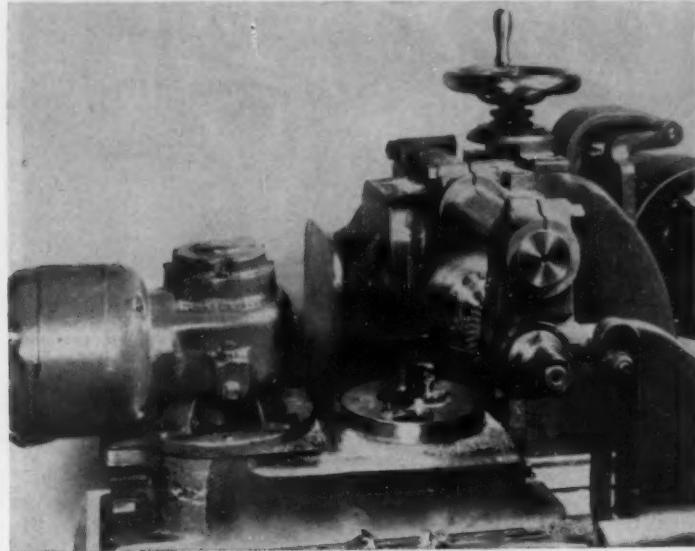
In addition to such fixtures being used in plain ratchet type, they are available in a ratchet and degree indexing type. On these, friction pads are used, and a friction handle is added. Using these, any odd angles or combinations of two odd angles can be obtained with positive stops. Another possibility is addition of an automatic indexing device to such tools. This can be quickly

from

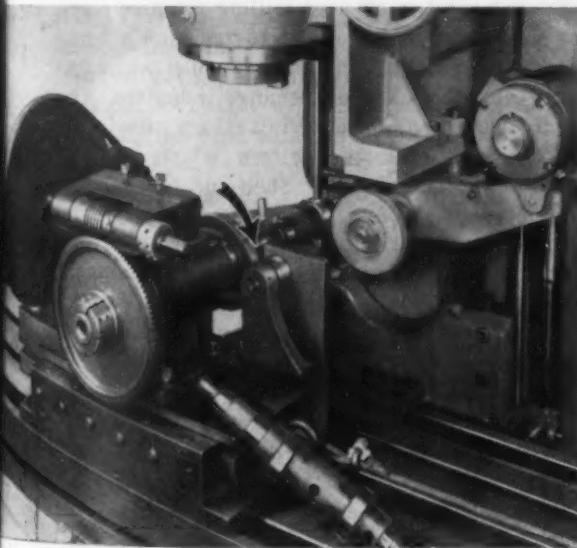
# MILLING MACHINES



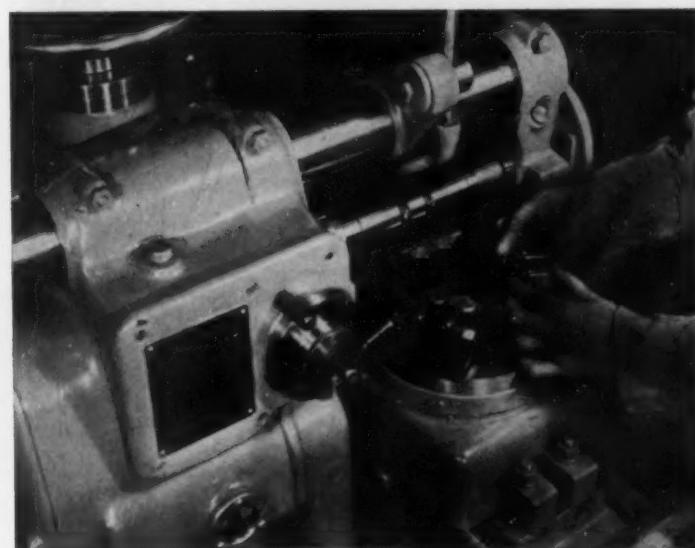
INDEXING chucking fixture in use for milling slots. Its two sides may both be used as bases, so that it can be mounted to hold the work either with the axis vertical or horizontal, with equal rigidity in either case.



WEDGE-SHAPED CUT is milled with the aid of an oscillating fixture. Two finished pieces show in foreground. Part is brass prism holder, and production is 45 parts per hour.



CAM grinding being done on milling machine with cam milling attachment. Oversize master cam rides on roller of stationary follower (arrow) causing fixture base to slide according to cam outline. Completed camshaft in foreground.

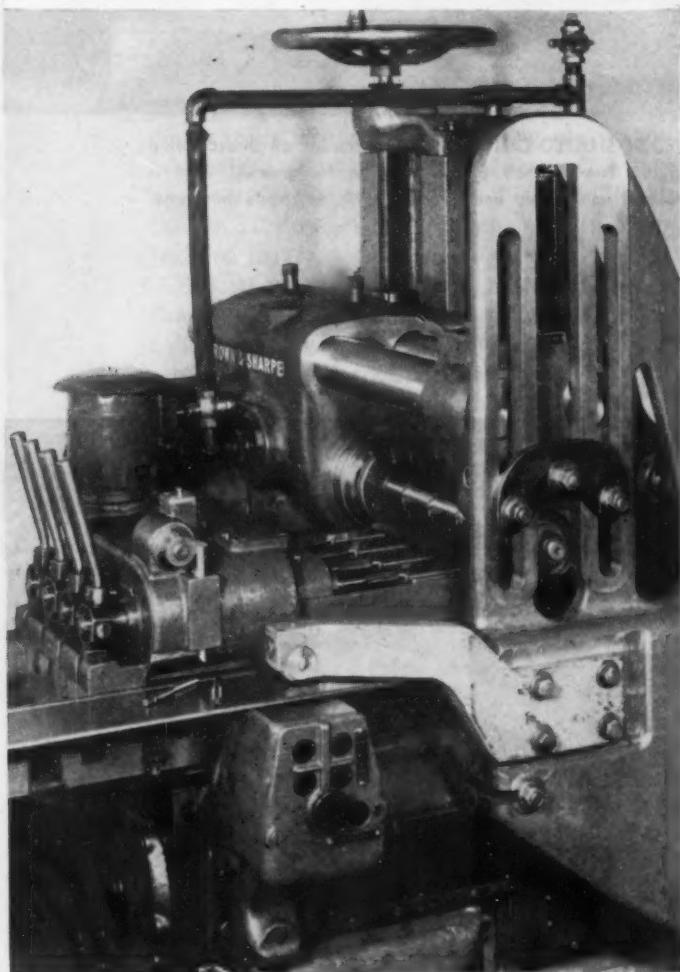


KEY MILLING operation utilizes special 3-station indexing fixture. Operator loads at one station while keys in another are being milled. Indexing is automatic. Production is 600 per hr at 85 pct efficiency.

### Milling machine attachments (continued)



MILLING between blades of supercharger impeller with special fixture. Sweep-milling of the pie-shaped sections between fins is automatic. Automatic index fixture base was modified to include sweep-milling feature.



STANDARD milling machine with special fixture, milling flutes in taps. Fixture holds four pieces, is automatically indexed, and stops when pieces are completed.

set to index 1, 2, 3, 4, 6, or 12 times and then knock the piece out. When used on an automatic milling machine, one person can tend more than one machine.

Such a device also greatly increases production possible on a hand milling machine. Plain milling vises are very much used for workholding on milling machines. In addition, there are swiveling vises, which may be set at any desired angle. Some vises have flanges designed to return coolant to the table channels.

Some swivel vises are centered on a stud and have their bases graduated in degrees, allowing the work to be quickly set at any desired angle to the table ways. There are also vises having a swinging adjustment in the vertical plane, and others of universal type having adjustments in both the horizontal and vertical planes. Such vises do not equal in rigidity those with adjustment in the horizontal plane only, but are suitable for light cuts.

Rough work, such as castings and forgings, generally cannot be held firmly enough in regular smooth-jawed vises. Special vises have been developed incorporating a jaw which can freely swivel, and thus adapt itself to surface irregularities or to clamping surfaces, which are not parallel. The jaws are both hardened and serrated.

Some standard vises are particularly adaptable for use with special jaws, which will allow them to readily receive and firmly hold work of special forms. There are many instances where a standard vise may be fitted with special jaws, and cost of a fixture saved.

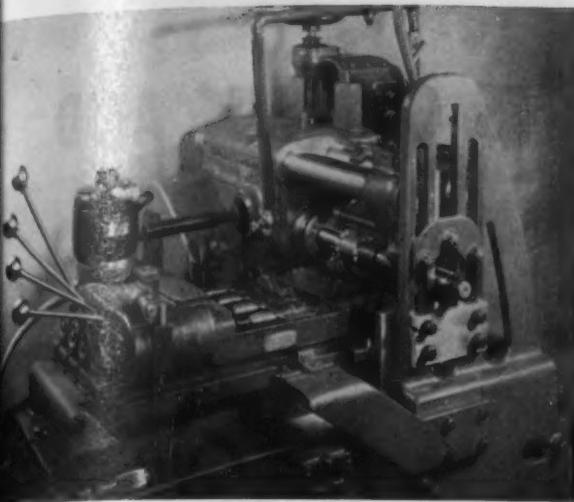
Some small milling machine vises are particularly designed for high production on small work, having a quick lever clamping action.

#### Arbor accessories valuable

Fundamental to efficient milling machine practice are accessories related to machine arbors. Accessories of this kind include collet adapters, cutter adapters, spindle change adapters, fly-cutter arbors, and centering plugs, used for locating large-diameter cutters which bolt directly to the spindle end. Shell end mills, quick change adapters, and cap-type arbor supports are also available. Chuck adapters are used for applying a chuck to milling machines having a standard flanged spindle nose. Chucks are fitted with a suitable flange for use on a dividing or index head.

Rotary tables are sometimes referred to as rotary milling fixtures, or circular milling attachments. They can be either hand-operated or power-driven. Some are power driven, yet also provided with a hand-operated indexing attachment. They are usually graduated around their circular edge, so that angular value of any movement may be directly read.

Often, circular milling attachments have a lever by means of which the worm and worm-



MILLING grooves in boiler tube cleaner heads, using special automatic fixture operated by torque motor. With 2 pieces on each arbor, production is 53 pieces per hr. Curved tooth shape is obtained by cam rocking fixture about hinge at left. Finished parts are shown near hinge.

wheel may be disengaged. This allows the table to be revolved by hand for setting-up. Some units have their table circumference graduated in half degrees, and have an index finger adjustable to permit readings to be taken from the nearest graduation. Fine adjustment is provided by an adjustable dial behind the handwheel, which is graduated to read to 2 min. Adjustable dogs can be provided to allow automatic throwout of power rotation in either direction.

Rotary milling attachments are chiefly valued for their ability to perform a variety of circular operations, such as cutting segments of circles. But they nevertheless provide a convenient method of indexing many other types of work which can best be mounted on a flat table or plate. They also serve to locate and mill angularly-spaced holes or slots, and have often been found of great value for milling irregular contours. In the latter case, of course, a combination of milling machine table travel and work rotation is involved.

Index bases are often employed as an integral part of a milling machine setup on high production work. These reduce idle or machine loading time to the absolute minimum, because work is being loaded at the front end while parts on the other end of the base are being milled. In some cases, a special keyway milling attachment is used for rounding out ends of keyways. Such

attachments are provided for mounting on the face of the column with support from the over-arm. Quill adjustment and fixed stops in this device provide a fast and accurate method for positioning the cutter to correct depth.

Cam cutting attachments allow either power or hand feeding, and will mill face cams or cylindrical cams. The change from face-cam to cylindrical-cam milling is made by turning a worm-wheel to a position at right angles to the machine spindle. For cutting constant-rise cam lobes on radial cams, there is a method using a swivel spiral index head together with a special milling machine attachment.

#### Special fixtures used

Much milling machine production is aided by specially-designed fixtures. Fixtures have been made with an oscillating feature. Where work is oscillated a predetermined amount in a horizontal plane, wedge-shaped cuts and other effects can be obtained. Hinge-type fixtures can be arranged to obtain an oscillating or swinging motion in the vertical plane while a cut is being made. Stationary cams, advancing with the milling machine table, impart the necessary lift.

In some cases, it is found expedient to provide a fixture with a work-carrying circular member, revolving in a vertical plane, carrying small work-pieces in openings around its rim. Different sweep-milling jobs are performed through use of suitable cams. Fixtures which index automatically through use of mechanical means, electrically, or by compressed air, are often used.

Torque-motor indexing is often used where indexing motion extends through a large arc. While actual milling is being done, the torque motor functions to hold an index plate of ratchet design against the index locking pin. When the cut has been completed and the table returns, a dog positioned on the front face of the table withdraws the locking pin for an instant. This allows the torque motor to revolve the index ratchet. The index ratchet is then re-located as the locking pin re-seats.

There are some cases in which a torque motor is employed for indexing for multiple-spindle setups. Here, backlash is liable to occur unless the indexing plate and the locking pin is mounted on that spindle which is farthest removed from the torque motor. On torque-motor indexing setups, the milling machine table stops in the loading position, after the final cut has been made in the work.

## —NEW BOOKS—

"Engineering Materials," by Joseph Marin. The need for a materials book related to design, a book with an analytical approach, has been filled with this text. Geared for student interest, the book is suited for courses in engineering materials, properties and testing of

materials, and materials of construction. It is divided in three parts: Mechanical Properties, General; Specific Materials; Materials-Testing Machines and Strain Gages. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. \$8.70. 491 p.

Solves problem, cuts costs—

## Ion exchange SAVES CHROMIC ACID

Ion exchange is being successfully used by an Eastern aircraft manufacturer to recover valuable chromium and chromic acid from plant waste.

The method recovers chromium-containing ions from anodizing aluminum, chromium plating and copper stripping baths.

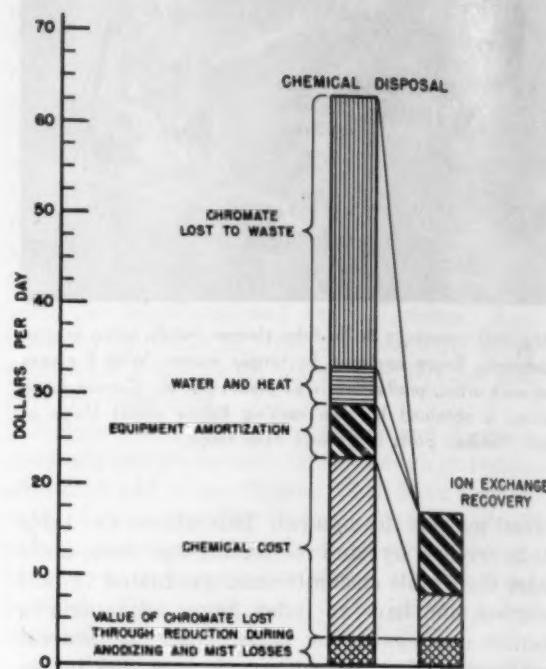
In anodizing, chromate dissolves some metal, producing trivalent chromium from the hexavalent form. For bright dipping or copper stripping, this is necessary. For electroplating, it is an unnecessary side reaction. In all processes, it results in consumption of the acid and produces a toxic chromate salt which cannot be reused, is generally highly concentrated, and is difficult to dispose of.

A recovery process developed by the Permutit Co. returns the chromate in usable form to the treatment tank. The synthetic ion exchange uses resins, Permutit Q and Permutit S.

A cation exchanger removes metallic cations from the strong chromic acid anodizing solution. An anion exchanger recovers the chromate from the dilute rinse solutions.

In the process hydrogen ions are exchanged for metallic ions. Used on the anodizing line it permits complete ion exchange chromate recovery.

The anodizing bath operates at a pH between 0.7 and 0.9 and 50 to 70 g per liter of CrO<sub>3</sub>. Each day, a portion of the bath is withdrawn and treated. Aluminum and other metallic cations are removed. The effluent solution has a very low pH and is returned and mixed with the remainder of the chrome bath, lowering the over-

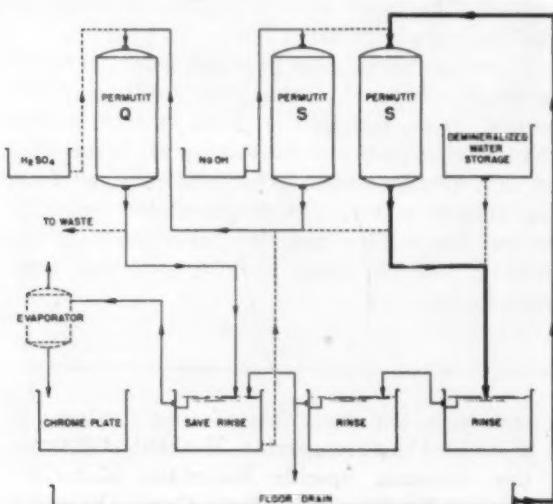


COMPARATIVE COSTS of disposal chemical and ion exchange recovery of chromic acid show big savings for latter.

all metallic content and pH somewhat. Anodizing continues during the treatment.

Operation of the unit for about 1 hr a day maintains the metals at a reasonable level. The pH in the bath can be maintained within close limits and little CrO<sub>3</sub> need be added.

When the Permutit Q resin becomes exhaust-



CHROMATE RECOVERY equipment uses synthetic resins to exchange hydrogen ions for metallic ions in bath solutions.

ed, it is regenerated by treating with sulphuric acid. The effluent H<sub>2</sub>SO<sub>4</sub> is sent to waste, carrying with it the metallic cations. The acid is then washed from the unit with water. It is necessary to displace the chromic acid with water. This results in some dilution which compensates for dragout and evaporation losses.

Incorporation of a save-rinse tank conserves from 60 to 90 pct of the chromate being dragged from the treatment tank. The remaining chromate may be treated by sending rinse water through an anion exchanger. Permutit S, which removes the chromate ions from solution and substitutes hydroxyl ions.

# NEW equipment

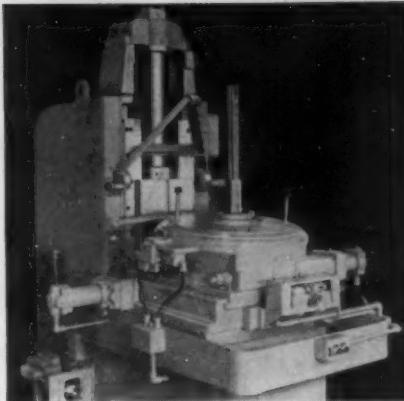
New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 155 or 156.

## Pull-down broach produces tapered splines

Use of the broaching process in the production of accurate tapered splines on several different sizes of parts is possible with a broaching machine. Basically the machine is a Colonial 15-ton, 66-in. stroke pull-down model equipped with special table and adjustable short shuttle travel. The machine illustrated produces several sizes of angular straight-sided splines in tractor sprocket wheels, etc., of

varying OD's. Tractor wheel is placed over the broach tower on a fixture plate with the broach in the down position. The angle of the plate is made so that the broach, which travels vertically, will produce splines with the correct amount of taper. Operation is hydraulic throughout with electrical controls. Largest part broached has 42-in. OD. *Colonial Broach Co.*

For more data circle No. 19 on postcard, p. 155.

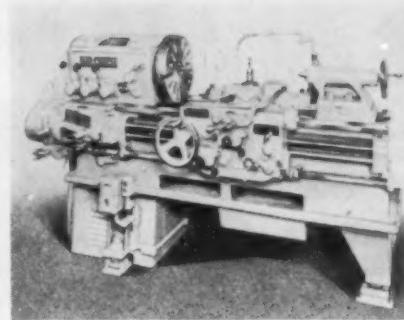


## Sea-worthy lathe of welded construction

Maintaining accuracy and alignment in precision metalworking lathes aboard ship is provided by a specially-designed engine lathe. It features a fabricated steel bed to which are attached hardened steel ways that insure permanent accuracy. Bed rests on a full length base supported by welded steel legs set on three cushioned bearings.

These bearings sustain the lathe's weight and anchor it in position to the ship's deck. The rear is a pivot, the front allows horizontal motion at right angles to work centers, and the tailstock bearing allows horizontal motion in all directions. These provisions block transmission of strains to the bed. *Reed-Prentice Corp.*

For more data circle No. 20 on postcard, p. 155.



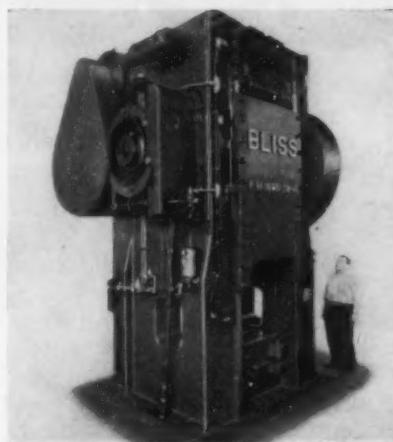
## Improved line of high-speed forging presses

Available in capacities from 300 to 4000 tons, an improved line of high-speed forging presses features a heavy duty air friction clutch and an air release spring set brake, both mounted on a full eccentric main shaft. The welded steel frame is designed with main stress members located immediately adjacent to either side of the die seat and extending from the bottom of the bed to the top of the crown. These members have heavy sections to

keep elongation of frame to a minimum when load is applied to press. To assist smooth operation, a buffer cylinder is installed in the crown to assist the brake in stopping the heavy slide at top of stroke and furnishes accelerating force when starting the slide, easing the load on the clutch. A load indicator furnished as standard equipment. *E. W. Bliss Co.*

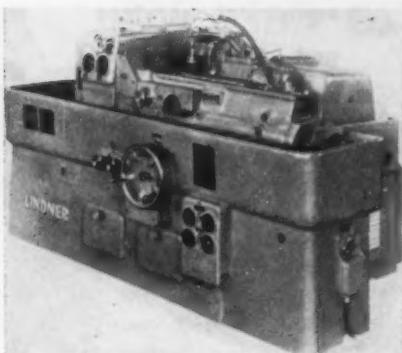
For more data circle No. 21 on postcard, p. 155.

Turn Page



## New Equipment

Continued



### Thread grinders handle high precision work

Close tolerances on both traverse and plunge grinding are maintained by four standard Lindner thread grinding machines. Lead tolerances can be held within 0.00008 in. over a 1-in. length and within 0.00024 in. over 20 in.; pitch tolerances can be held within 0.0002 in. per in. While all four types incorporate the same fundamental design principles, each is

built for particular range of tool-room or high production work. Helix angle is adjusted by swiveling the work table. Dial calculators permit ready determination of both feed and helix angle. Precision threads on a hardened tool are ground by plunge method, using multiple grooved wheel. *Kurt Orban Co., Inc.*

For more data circle No. 22 on postcard, p. 155.

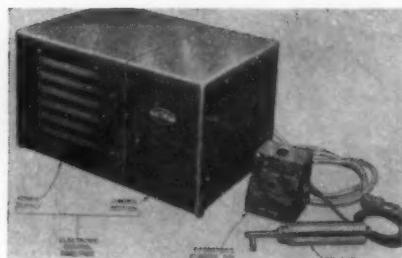


### Vapor steam cleaner has 120-gal capacity

Claimed to provide peak efficiency of performance at minimum expense, the Circo vapor steam cleaner has a fully automatic, safety protected system that enables one-man operation while accelerating the cleaning process. At the snap of a switch a spark is generated that ignites the burner and puts the machine in almost instant action. Automatic controls main-

tain the operation at its peak. The entire system is automatically protected from excessive pressures at three independent points. Mixing of the cleaning compound is automatic from the time dry compound is placed in the tank until it emerges as a super saturated jet of steam from the gun. *Topper Equipment Co.*

For more data circle No. 23 on postcard, p. 155.

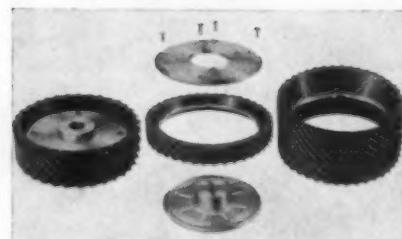


### Robot "feels" contour of master patterns

Single motion duplicator speeds up precision machining of metal parts. This electronic robot "feels" the contours of a master pattern for machining exact duplicates of the original. Average time for completing a single part is said to have

been reduced as much as 80 pct and spoilage by at least 20 pct. The duplicator consists of a follower, an electronic control unit and an output drive motor. Installation problems vary. *Raytheon Mfg. Co.*

For more data circle No. 24 on postcard, p. 155.

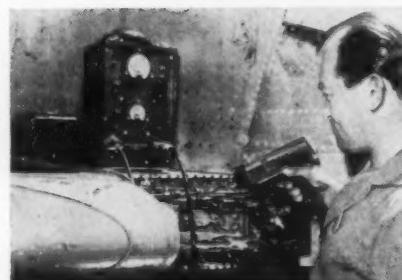


### Universal hub contact wheel cuts costs

Assembly of universal hub contact wheel consists of universal hub, side plate and T-61 serrated rubber tire. Each part is balanced so that assembled unit is in balance. Universal hub and plate unit will

mount T-61 tires from  $\frac{1}{4}$  to 6 in. wide and from 5 to 105 durometers in hardness—144 different tires of varying width and/or durometer. *Carborundum Co.*

For more data circle No. 25 on postcard, p. 155.



### Leak detector checks fuel cells of aircraft

Time needed to check for leaks in fuel cells of aircraft is decreased by use of a portable, pistol-like leak detector. The equipment can discover openings so small that only  $1/100$  oz of air would escape in a year, it is reported. In operation, a small amount of a halogen is in-

jected into the empty fuel system prior to its installation in the airplane, and is maintained under a specific pressure. The leak detector is then run over the system. *General Electric Co.*

For more data circle No. 26 on postcard, p. 155.

Turn Page

# How to solve 39 PRODUCTION PROBLEMS with Mead Air Devices

**SEE how to use standard Mead units to make automatic or semi-automatic machines!**

New 16-page Mead PHOTO-BOOKLET presents actual examples in pictures and text of 39 different, tough production problems solved by various combinations of Mead Air Operated Devices. This interesting booklet shows how to:

- (1) De-burr small parts fast (2) Press 3 components together (3) Tap die cast knobs (4) Insert rubber discs into metal cups for insecticide "bombs" (5) Swage hubs to hypodermic needles (6) Ream center hole in valve plate (7) Broach 2 internal slots in brass valve inserts, handling 4 sizes (8) Press filters into copper shells and indent dimple in shell (9) Tap 2 holes  $\frac{1}{8}$  in brass brush holders. (10) Drill and tap a 1 1/4-20 hole 9.16 deep then ream "bell-mouth" in stainless steel forging (11) Drill and ream a hole to controlled depth in brass valve body. (12) Drill No. 52 hole thru end of solid graphite pencil. (13) Press plastic liners into perfume bottle caps (14) Drill cast iron gas burners (15) Drill  $\frac{1}{4}$  hole thru steel axle of fishing reel (16) Carry copper rods thru series of gas flames to braze special tips to lower ends. (17) Chamfer hole in spark-plug bodies approx. 3,600 per hour (18) Swage steel ball into brass nose of ballpoint pen approx. 3,600 per hour (19) Assemble patented brass couplings and flare neck into nut to simultaneously form fluid-tight seat (20) Drill twin holes in chain-saw teeth (21) Counter sink both sides small washers,

MEAD SPECIALTIES COMPANY, Dept. BA-52, 4114 N. Knox Ave., Chicago 41, Ill.



May 1, 1952



Typical Work  
Pieces Handled



TEAR OUT MEMO COUPON  
FOR YOUR COPY . . .

## Memo Coupon

MEAD SPECIALTIES CO.

4114 N. Knox Ave., DEPT. BA-52, Chicago 41, Illinois  
Send new MEAD PHOTO BOOKLET "Air Power At Work" specially printed in green and black.

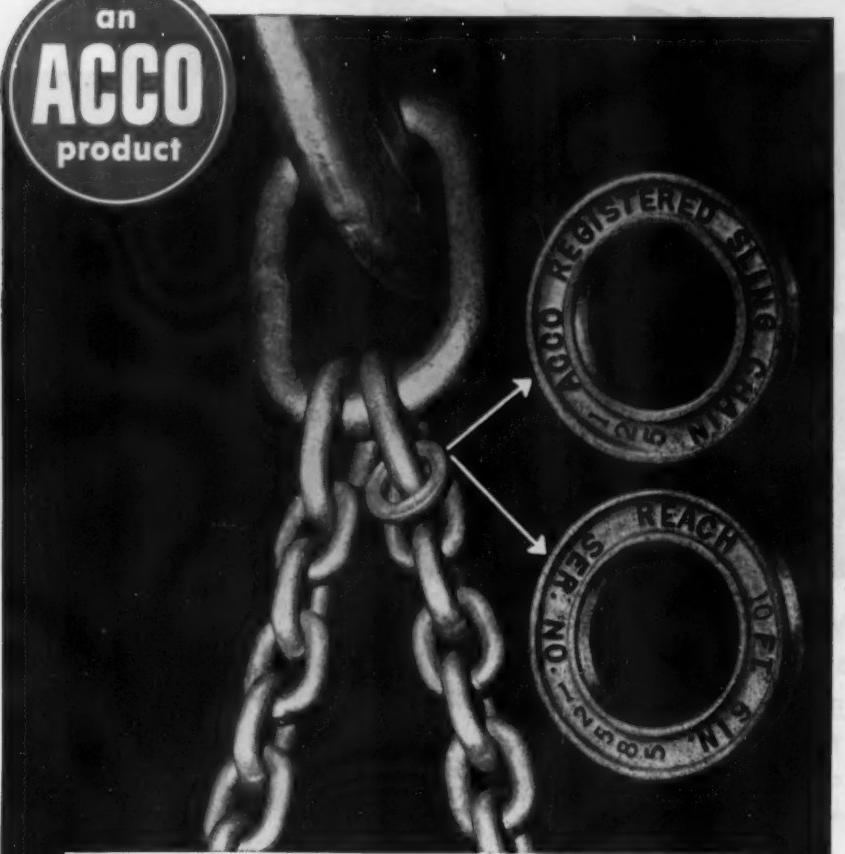
Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_





## a Sign of Safety

• The identification ring you find on every ACCO Registered Sling Chain is your sign of safety. It's your guarantee of quality. It makes it easy for you to select the correct . . . safe . . . sling for each lift.

You can get ACCO Registered Sling Chains in the type, material, and size best suited for your work. No better sling chains are made. See your AMERICAN CHAIN distributor or write for Catalog DH-314.



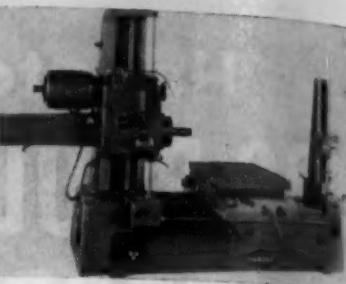
AMERICAN CHAIN DIVISION  
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles,  
New York, Philadelphia, Pittsburgh, Portland,  
San Francisco, Bridgeport, Conn.

American  
Chain

## New Equipment

Continued



### Horizontal boring mill

New 3-in. horizontal boring mill has 18 feeds with rapid traverse in all directions. Infinite control of feeds on facing head, and heavy 10 hp motor with amperage load regulator are other features. Maximum run of spindle is 32½ in., with 16 speeds. Turntable measures 34½ x 25½ in.; has longitudinal run of 45½ to 57½ in.; transversal run of 24 in. *Diamond Machine Tool Co.*

For more data circle No. 27 on postcard, p. 155.

### Plastics housings

A one-piece plastics housing is being molded for a new 1/3 hp window-type air conditioner. Measuring 26 in. long x 13 in. wide x 12 in. deep, the housings are being molded of GE phenolic compounds with louvers for the direction of cooled air molded in. Produced in a 1300 ton compression press from molds weighing 6 tons, the housings weigh 9 lb. *General Electric Co.*

For more data circle No. 28 on postcard, p. 155.

### High frequency blower

Need for circulating air to enclosed electronic components aboard aircraft has initiated development of variable frequency motor-blowers. These are powered by the standard generators linked to the aircraft motors. The frequency of the generated current varies widely, depending on engine speed. Blowers are said to operate at higher average speeds and at less input over the frequency range encountered. Speed is more uniform and a greater cfm output is developed. *American Electric Motors, Inc.*

For more data circle No. 29 on postcard, p. 155.

## Speedy inspection

New, high-speed dye penetrant inspection process serves industries in which production-line inspection is desired. The new, non-flammable product, called Turco Chek-Spek, is a partner of Turco Dy-Chek. Following pre-cleaning by vapor degreaser, the red Chek-Spek penetrant is applied to parts being inspected. After being allowed to dwell sufficiently long for it to enter even the smallest defect that extends to the surface, the surface dye is removed by suspending parts in vapor zone of a vapor degreaser. Following dye removal, the white developer is sprayed onto parts. As this dries the red dye bleeds into it, clearly locating and defining the extent of existing flaws. *Turco Products, Inc.*

For more data circle No. 30 on postcard, p. 155.

## Unit pillow block

An improved unit pillow block has a lubricant-retaining du Pont Fairprene red seal. Practically frictionless wiping action of the seal against the inner bearing ring is a feature of this Hess-Bright SY unit. It is quickly applied, factory-sealed against dirt contamination, requires infrequent lubrication. *SKF Industries, Inc.*

For more data circle No. 31 on postcard, p. 155.

## Pump-motor

New 2000 psi vane-type oil hydraulic pump can also be used as a fluid motor. The pump-motor is single stage, incorporating principle of radial balance and construction. No alterations are necessary to utilize its two-way performance. The unit permits clockwise or counterclockwise rotation for both pump and motor operation. Its three major parts are easily disassembled by removal of a few cap screws. Four sizes are available. Capacities in pump application range from 2½ to 60 gpm; in fluid motor use, capacities range from 12 to 257 in.-lb of torque per 100 psi. *Denison Engineering Co.*

For more data circle No. 32 on postcard, p. 155.  
Turn Page



## Can YOU Do This?

• Do your slings give maximum safety in handling the 101 odd loads that your crane moves daily? A combination of *ACCO Registered* Wire Rope Slings, as shown above, can be used safely because all fittings and attachments have full rope strength.

The DUALOC Ending produces the strongest wire rope sling made. Two collars insure uniform strength from sling to sling. Actual strength certified by warranty certificate. Preformed improved plow steel Green Strand wire rope with steel core assures maximum resistance to kinking.

Popular sizes in stock for immediate delivery.

\*Trade Mark Registered

**ACCO**



WIRE ROPE SLING DEPARTMENT  
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles,  
New York, Odessa, Tex., Philadelphia, Pittsburgh,  
San Francisco, Bridgeport, Conn.



# Vapor FROM Paper

## STOPS RUST

Angier

VPI\*  
WRAP

Angier

Distributors in All Principal Cities

Angier Corporation, Framingham 10, Mass.

Send "VPI Facts" as applied to:

- |   |  |
|---|--|
| <input type="checkbox"/> Machinery-Industrial, Metal Working, Farm, Office, Construction. | <input type="checkbox"/> Electrical Machinery, Appliances, Products.   |
| <input type="checkbox"/> Transportation Equipment — Auto, Aircraft, Naval, Railroad, etc. | <input type="checkbox"/> Fabricated Products — Cutlery, Hardware, etc. |
| <input type="checkbox"/> Steel in process of fabrication.                                 | <input type="checkbox"/> Ordnance Equipment.                           |
| <input type="checkbox"/> Instruments and clocks.  | <input type="checkbox"/> Other.  |

Sign below, attach to your letterhead

\* ® Vapor Rust Preventive



### PACKAGING COSTS CUT FROM \$4.95 TO \$1.37

Back when messy oil and grease coatings were used to ward off corrosion of diesel locomotive parts, the maker had headaches at both ends of the line.

Packaging steps called for inflammable liquids, heavy handling equipment, air hoses, and varnish-like petroleum solutions. In those days, waxed paper and heavy wooden crates were "musts." At the railroad end, unpacking meant the same troubles in reverse; laborious "cleaning" was a costly chore.

Now, says the diesel firm, "packaging is a dream."

Large and small parts are protected only by a paper that gives off vapor. *It stops rust.* It is Angier VPI\* Wrap.

A cylinder liner (see above) is simply put in a container with pieces of the paper. The lid on, VPI goes to work. Now cost of packaging is \$1.37 — not \$4.95. The liner is ready-to-use when received. No "cleaning" to do.

If you store or ship metal parts or products, get "VPI Facts" from Angier — the most experienced name in vapor rust preventives.

### New Equipment

Continued

### Small parts finishing

A system which completely finishes 1440 small parts per hour has been announced. The equipment washes, phosphatizes, rinses, and dries the parts, then dip paints, drains and bakes them, returning them to the loading station for unloading by the operator. *Cincinnati Cleaning & Finishing Machinery Co.*

For more data circle No. 33 on postcard, p. 152.

### Humidity testing

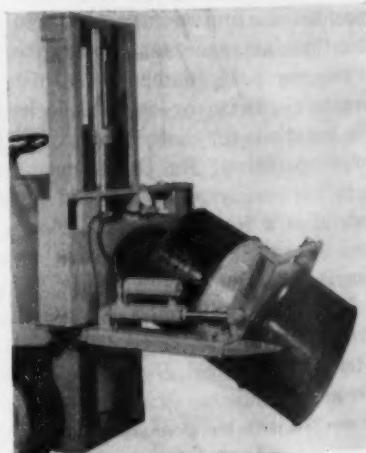
With a 27 cu ft working area, a new humidity testing cabinet will supply relative humidity between 20 and 95 pct in the temperature range 35° to 185°F. Advantages claimed for the unit are faster temperature regulation throughout the range, and elimination of troublesome and damaging condensation caused by changing temperatures during the course of a test. *Murphy & Miller, Inc.*

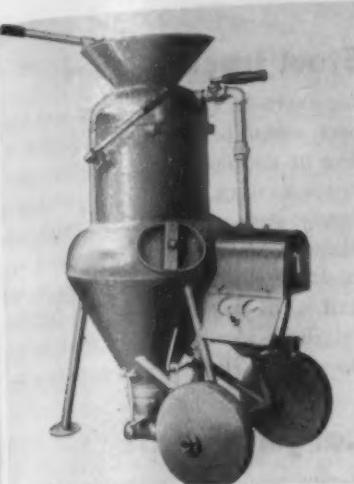
For more data circle No. 34 on postcard, p. 152.

### Drum up-enders

Hydraulic drum up-enders attachment permits fork truck operators to pick up, transport, stack and empty heavy drums without leaving their seat. Drums can be rotated 90° for vertical or horizontal stacking, or tilted 45° below horizontal for emptying at any height within the lift range of the truck. Up-enders fit 2000, 3000 and 4000-lb Baker fork trucks. *Baker Raulang Co.*

For more data circle No. 35 on postcard, p. 152.





### Air-placed material

The Blastcrete machine shoots material into place. It handles cement, sand, lightweight aggregates, refractories, light gravels and other sandy or granular or powdery materials. The operator has complete control of air pressure and material volume and all adjustments can be regulated while the machine is in operation. Due to design of agitating and material metering mechanisms, a small amount of air is required for this purpose, permitting use of small air compressors. The machine can be adjusted to deliver from a few cubic feet of material per hour to 4 cu ft per hr. Three sizes are available. *Blastcrete Equipment Co.*

For more data circle No. 36 on postcard, p. 155.

### Low cost molds

Making complex molds in minutes for low pressure, vacuum, slush or lay-up molds for laminations is now accomplished by metal spraying. The master is sprayed with a layer of Spramold wire, a low melting point metal alloy, to a thickness of 0.040 in. Then a layer of Sprabronze AA, an aluminum bronze alloy, is applied to a 0.030-in. thickness, for additional strength and to relieve internal stresses. This layer is followed with another 0.040 in. of the Spramold wire. There is no distortion of the mold because very little heat is retained by the metal particles when they strike the master. *Metallizing Engineering Co., Inc.*

For more data circle No. 37 on postcard, p. 155.

**Turn Page**

# DURASPUN

30% Cr.  
20% Ni.  
1% Mo.



**P**erhaps the most interesting feature of this Duraspun High Alloy Casting is that four different sizes of centrifugal castings are involved. These vary from 3 $\frac{1}{4}$ " to 3 $\frac{1}{2}$ " in diameter. Sections, outlets, collar bands, lugs etc., were all welded together in our shop to form the retort as you see it in the picture. Assembled weight runs around 7464 pounds.

**High alloy castings is our business—not merely the adjunct of an extensive steel founding business. We have the experience—30 years in the static casting division and 20 years on centrifugal castings. We pioneered both kinds for castings in this country. And we have excellent testing and checking facilities, including a 400,000 volt X-ray machine and gamma-ray units.**

If you would like this combination of wide experience, modern shop practice, up-to-date equipment and full testing facilities working on your next high alloy casting, bring it to us.

## THE DURALOY COMPANY

Office and Plant: Scottdale, Pa. • Eastern Office: 12 East 41st Street, New York 17, N.Y.

Detroit Office: THE DURALOY COMPANY, 805 New Center Building

Atlanta: J. M. TULL Chicago: F. O. NELSON San Francisco: JOHN D. FENSTERMACHER  
Metal & Supply Co. 332 S. Michigan Avenue 1241 Taylor Street

METAL GOODS CORP. Dallas • Denver • Houston • Kansas City • New Orleans • St. Louis • Tulsa

## New Equipment

Continued

### Steel truck casters

An extra heavy 8-in. diam size has been added to the Bassick Series 99 line of double ball race swivel steel truck casters. The super 99 extra heavy gage steel,  $\frac{1}{4}$  in. thick top plate, with heavy king pin and adjustable bearing assembly, 6 in. and 8 in. sizes, is intended for the toughest service. Bassick Co.

For more data circle No. 38 on postcard, p. 155.



## Demonstrates strapping unit loads to cut unit costs

LIKE other Brainard Strapping System salesmen, Paul Frank of St. Louis sells with service.

Here Paul demonstrates the proper use of Brainard steel strapping and strapping tools to secure four separate crates into a unit pallet pack. Such palletized loads expedite materials handling before shipment, in transit, and at the receiving end.

Use the experience of Paul Frank and his fellow Brainard salesmen. They are qualified to study your packaging and handling operations, then recommend and demonstrate the most efficient strapping system for you.



WARREN, OHIO

COMPLETE STEEL STRAPPING SERVICE, LIGHT AND HEAVY DUTY STRAPPING, TOOLS AND ACCESSORIES

For new catalog on Brainard Strapping System write Brainard Steel Division, Dept. 0-3, Griswold St., Warren, Ohio.



### Surface comparator

Portable electronic surface comparator determines surface roughness at the point of production. It evaluates quality of a surface finish and indicates the index in microinches rms on a meter with the needle at an arrested position. No visual or mental averaging is required. Roughness range is 1 to 100 microinches rms. Kota-Meters, Inc.

For more data circle No. 39 on postcard, p. 155.

### Hole punching units

New Hydra-Strip hole punching units punch and strip material up to  $\frac{3}{4}$  in. thick. These extra duty units that punch round and shaped holes are equipped with the built-in Wales Hydra-Spring that provides greater stripping pressure than mechanical springs of the same volume. Punching units are self-contained, with all component parts built-in. Wales-Strippit Corp.

For more data circle No. 41 on postcard, p. 155.

## Stored lubricant

A recent development in powder metallurgy is a stored lubricant wear plate. The all metal wear plate is a single piece containing a large internal cavity. The cavity is filled with an extremely porous, yet rigid metal sponge containing the lubricant. This distributes the lubricant to either surface of the plate through pores in the wall of the cavity. Predetermined passages can be arranged in any configuration to meet the requirements of any application. Michigan Powdered Metal Products Co.

For more data circle No. 42 on postcard, p. 155.

## Hose repair kit

Fast Fix kit for on-the-job repair of cutting and welding hose is complete with all necessary tools and replacement parts for putting a new nipple-ferrule-nut assembly on the end of a length of hose, permanently splicing two lengths of hose, temporarily coupling two sections of hose. Gas Arc Supply.

For more data circle No. 43 on postcard, p. 155.

## Separator filter

Removal of condensate liquid from compressed air and any vapors that may be present is accomplished with a new separator filter. The unit consists of a separator on which is mounted a transparent cylinder holding the desiccant which removes the vapor. Liquids from the separator are collected by a trap, then automatically discharged into the atmosphere at the bottom. Jas. A. Murphy & Co., Inc.

For more data circle No. 44 on postcard, p. 155.

## Drill stop

Uniform hole depth can be held by using a new drill stop on turret lathes, drill presses, and radial drills for operations such as center drilling, drilling and reaming. It provides a positive stop which ends guesswork and reduces rejects. Stops on fixture bushing or work. Four chip grooves tend to remove any chips from the surface on which it stops. Made in 8 sizes having Morse Taper shanks and holes. Scully-Jones & Co.

For more data circle No. 45 on postcard, p. 155.

The logo for Electro Refractories & Abrasives Corporation features the word "Electro" in a large, flowing script font. Below it is a small illustration of a bison's head. Underneath the script, the words "TRADE MARK" are printed in a smaller font. At the bottom of the logo is a dark bar with the year "1919" in white. The entire logo is set against a dark background.

# Specific Purpose Grinding Wheels

Electro Engineers recognize and properly evaluate those factors that make every grinding operation a little different. • We note the nature of the operation, material to be ground and the accuracy and finish required but, more important, we consider the variable factors that are peculiar to your grinding wheel application. • Then and only then do we "tailor" our wheels for your operation. • Write, wire or phone for an Electro Sales Engineer to survey your needs. We are eager to make wheels for your specific purpose. \*

Electro Refractories & Abrasives Corporation

344 Delaware Avenue, Buffalo 2, N. Y.

Regional Warehouse: Los Angeles 58, California

Plants: Buffalo, N. Y. and Cap-de-la-Madeleine, P. G., Canada

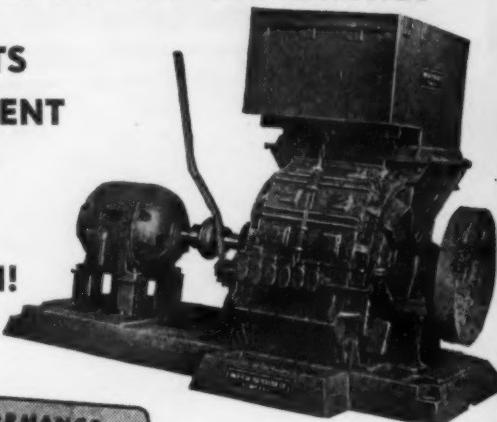
# More "CRUSHING" FACTS ON American CRUSHER PERFORMANCE

Case History No. 14

American METAL TURNINGS Crusher

AVERAGES 1000 TONS MONTHLY

... PARTS  
REPLACEMENT  
COST —  
**\$0.03**  
PER TON!



PERFORMANCE DATA

PROBLEM: To reduce machine turnings to shoveling chips.  
INSTALLATION: American Metal Turnings Crusher #3800.  
AGE: 6 years in operation.  
TONNAGE: Average 1000 Tons Per Month  
TOTAL PARTS TO DATE: \$2,028.30.  
PARTS COST PER TON: \$0.03

This performance record of a well-known Detroit manufacturer is familiar to other American Crusher owners, who have long since learned that there are 3 significant profit sources in every American installation: (1) American-reduced chips bring \$4 more per ton in the scrap market, (2) Chips release up to 50 gallons per ton in recovered cutting oil, (3) Chips require less storage space . . . are easier to handle.

WRITE for Metal Turnings Crusher Bulletin

American PULVERIZER COMPANY  
Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND

ST. LOUIS 10, MO.



Foundry:

Big jolt-squeeze-strip machine speeds motor block output.

Two of the world's largest jolt-squeeze-strip machines recently completed 60 days of operation at the Sorbo-Cast Foundry Co., New Brunswick, N. J. Output of truck motor blocks is reported to have been doubled through use of the machines made by SPO, Inc.

Handling time has been cut drastically and better castings are



WORLD'S LARGEST jolt-squeeze-strip machine is the claim made for this unit set up at Sorbo-Cast Foundry Co., New Brunswick, N. J. Better castings at lower costs are reported since machines were installed.

produced at a lower cost than was previously possible, it is reported. Manpower requirements have been reduced to a minimum.

**Large Copes, Drags**—The machine was developed for maximum speed and efficiency in the production involving massive copies and drags. It features push-button actuation of all operations from a conveniently located stand and solenoid valve control of each step in the production cycle.

Operating on standard psi line pressure, the machine has a squeeze capacity of 80,000 lb and jolt capacity of 4000 lb. Flask space ranges from 38 in. minimum to 54 in. maximum, left to right, and from 32 to 50 in., front to back. Cranes and conveyors are used to lighten and speed handling and to expedite flow of work to and from machines.

**Clad Tubing:**

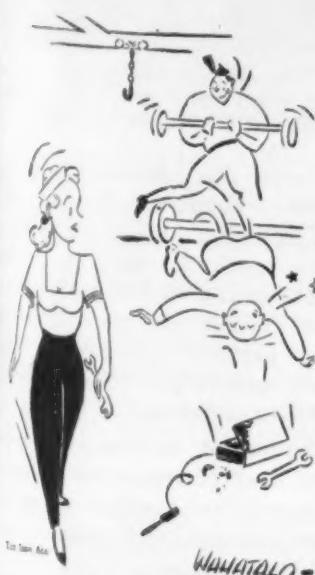
Lead clad copper tubing resists corrosion, has strength.

Lead's ability to resist the corrosive action of sulfuric acid and the strength and heat transfer properties of copper have been combined to advantage in a drawn, lead clad copper tubing.

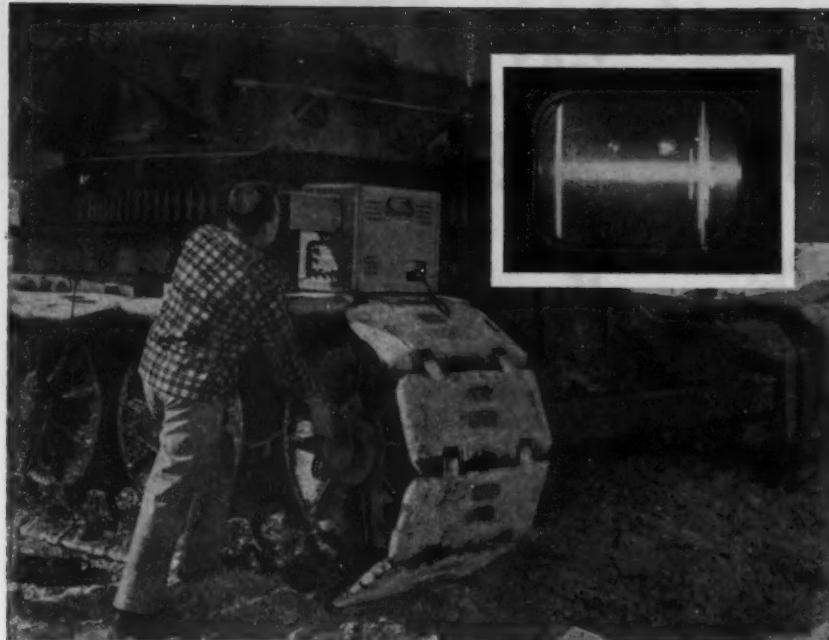
Made by Knapp Mills, Inc., the tubing, trade name Cupralum, has a soft, annealed, deoxidized copper tube base to which a uniform, dense-structured, non-porous lead cladding has been chemically bonded. Diameters range from  $\frac{3}{4}$  in. to 2 in., and the thickness of the lead cladding is from  $\frac{1}{8}$  in. to  $\frac{1}{4}$  in. with  $\frac{3}{16}$  in. being generally considered standard.

**Chemically Bonded**—Since the lead cladding is chemically bonded to the copper, heat transfer is kept at a high value. Physical strength to withstand steam pressures up to 200 psi, is provided by the copper tubing.

Physical properties of copper determine the physical limits of the clad metal. Because the lead is chemically bonded to the copper, it expands or contracts with the copper during temperature changes. It corrects the previous tendency of lead by itself to fail quickly through fatigue, since lead normally expands more than it contracts.



May 1, 1952



## STOP COSTLY BREAKDOWNS WITH SPERRY ULTRASONICS



Inspecting drill bits for possible fatigue cracks.



Inspecting the main shaft of a 48- by 60-in. jaw crusher.

The unexpected breakdown of production equipment has long been a costly and unpredictable expense.

The Sperry Ultrasonic Reflectoscope, the newest most advanced non-destructive testing instrument, is now being used for maintenance inspection without the necessity of time-consuming dismantling or moving of equipment to special locations.

By testing critical equipment at reasonable intervals, fatigue cracks can be detected and their subsequent growth followed, thus allowing an opportunity to schedule replacement or repair when production is least affected.

Inspections have been made successfully for several years on such equipment as—hoisting engine crankshafts and crankpins, sheave axles, hydraulic press cylinders, pressure and back up rolls and in most cases without time losses due to dismantling. Materials and parts produced by equipment such as this are also inspected for defects before vital machining hours are wasted.

Write for complete descriptive information on day to day commercial testing service, lease or sale of the Sperry Ultrasonic Reflectoscope.



**SPERRY PRODUCTS, INC.**  
Danbury, Connecticut

## Technical Briefs

### Maintenance:

Care of insulation can cut heat losses, operating headaches.

A neglect of insulation maintenance common in many plants, may lead to costly heat losses or operating inefficiencies. The Magnesia Insulation Mfrs. Assn. points out the need for maintenance may result from normal wear and tear or from failure to repair or replace insulation damaged or removed during alterations.

Most frequently, the need for insulation repair on pipe lines can be noticed around flanges and fittings which are opened for inspection or other purposes. Pipe insulation adjacent to chain hoists, doors or other moving objects may be damaged if not properly protected.



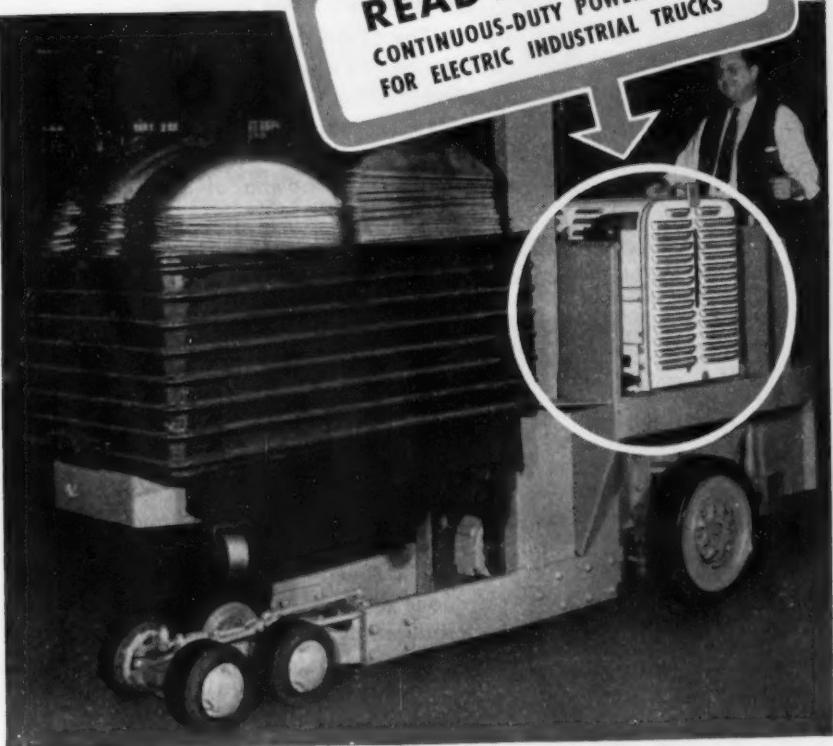
TYPICAL SERVICE installation has beveled edge around bolted cover to allow for easy removal without damage to insulation.

**Check Tie Wires**—Loose tie wires or bands and damaged canvas covering should be checked and repaired, the association points out. Small fittings, insulated with cement are more likely to need periodic re-insulation than pipes and larger fittings having molded insulation.

Equipment is likely to show most need of repair around manholes or other openings where the edges are subject to hard contact and abrasion.

"My Choice?  
READY-POWER  
DRIVE  
...Every Time!"

**READY-POWER**  
CONTINUOUS-DUTY POWER UNITS  
FOR ELECTRIC INDUSTRIAL TRUCKS



Remember...Your Truck Is No Better Than Its Power!



The READY-POWER Co.

3822 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

## —Technical Briefs—

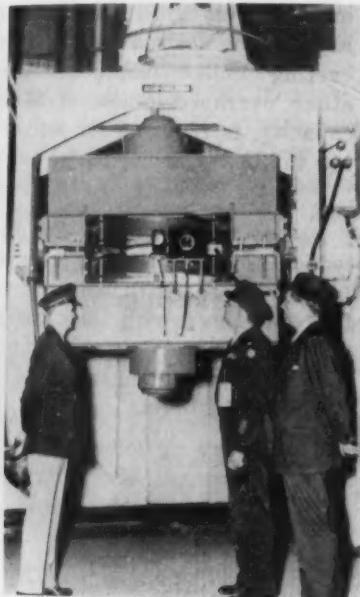
### Betatrons:

Foundries use three big units to check steel castings.

Three 24-million-volt betatrons, first ever built for industry, are being used in Eastern and Mid-western steel foundries to help speed production of armor steel castings for the Army's battle tank program.

Powerful enough to penetrate 7 to 9 in. of armor steel in little more than a minute, the X-ray giants greatly speed and improve inspection techniques formerly requiring hours and, in some cases, days. F. Kermit Donaldson, executive vice-president, Steel Founders' Society of America recently reported.

**Fourth On Way**—Units are being operated for the Army in armor-producing plants of Gen-



**BIG 24 MILLION-volt betatron at Commonwealth Plant of General Steel Castings Corp., Granite City, Ill., is inspected by Col. B. C. Fowlkes, Jr., left, Col. J. D. Childs, and C. P. Whitehead, president of General Steel.**

eral Steel Castings Corp., Granite City, Ill., and Eddystone, Pa., and by Continental Foundry & Machine Co., East Chicago, Ind.

\*For a more complete technical description of the betatron see "Ordnance Using X-Rays to Inspect Complex Assemblies," The Iron Age, Oct. 8, 1951, p. 95.

**Special Building** — Housed in specially designed radiation-proof  
Turn to Page 172

## 78% fewer hand injuries and 6¢ per man-hour cost saving *follow management study of work gloves*



**Case No. 207**—Problem: Company employing over 1000 men, to shear, form and dip-coat sheet steel products, found production penalized by frequent hand injuries from cuts, heat and acid burns, and resulting infections. Double canvas gloves, used to handle sheets, averaged 4 hours' wear at a cost exceeding 10¢ per man-hour.

**Management Solution:** Operations study by an Edmont specialist and on-the-job tests

leading to adoption of gloves with tough natural rubber coated palms and thumbs to handle dry sheets, and gauntlets heavily coated with NEOX (reinforced neoprene) for hot galvanized metal and acid baths.

A 78% reduction in hand injuries followed the change-over. The safer gloves also wore 3 to 5 times longer, at average cost-saving of 6¢ per man-hour. (Name of manufacturer furnished on request.)

### Hands are Important Production Tools

Our case records of hundreds of operations with sharp, abrasive or slippery materials, with and without the presence of heat, oils, acids, caustics, solvents and degreasants, prove that correct work glove selection results in:

**Fewer lost-time accidents • Faster, surer work handling  
Less spoilage • Improved job attitude • 40% to 70% savings in usual glove costs to companies or employees**

**There's a correct glove for every job  
Good management makes it available**



**Maximum Protection and Safe Grip**  
Extremely tough coating of NEOX (reinforced neoprene) over sturdy, sweat-absorbing, insulating fabric. Non-slip safety grip.



**Heavy or Standard Weight Coatings**  
Various weights of NEOX coatings on fabric, overall or palm - and - thumb coated only.



**Non-Slip Natural Rubber Coated**  
Comfortable, safer and wear 5 to 10 times longer than canvas gloves.



**Vinyl Plastic Coated Work Gloves**  
High resistance to abrasion, oils, many chemicals. Retain flexibility.

### We offer consulting service on specific problems or complete plant surveys:

IUsed by Ford Motor, General Electric, Union Carbide & Carbon, Continental Can, H. J. Heinz, Westinghouse and many others.

Without cost or obligation we will gladly study your hand-protection problems and practices, make recommendations and furnish the procedures and materials for complete on-the-job tests. For full information, write our Safety Engineering Service.

# Edmont

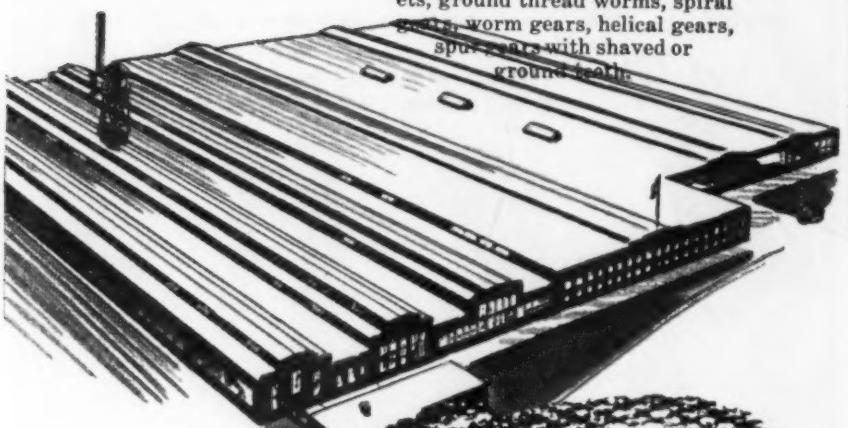
World's largest maker of coated industrial gloves

Edmont Manufacturing Company  
1234 Walnut Street, Coshocton, Ohio

# Among the consumers of custom-made GEARS... Precision & Perkins are accepted as synonyms

Equipment and facilities, coupled with the individual skills of New England craftsmen, enable this gear engineering organization to produce any type of gear in any quantity, and any material — metallic or non-metallic to your specifications. *Have us quote on your requirements!*

**PERKINS MAKES:** bevel gears, ratchets, ground thread worms, spiral gears, worm gears, helical gears, spur gears with shaved or ground teeth.



## A NEW PRODUCT— the PERKINS precision SPRING COILER

This patented coiler turns out precision springs — any type, shape, size from wire sizes .005 to .125. Complete data and prices upon request.

**PERKINS**  
MACHINE & GEAR CO.  
West Springfield, Massachusetts

## —Technical Briefs—

buildings, each unit cost approximately \$225,000. Applied to armor production, the betatron permits fast, positive inspection and provides sharp X-ray film records through metal sections ranging up to 24 in. in thickness.

In operation, the betatron builds up tremendous energy, developing and controlling the action of high velocity streams of electrons producing X-rays which are focused on the cast steel parts.

**Easily Positioned** — The betatrons are the largest inspection instruments ever adapted to foundry practice. Suspension of the betatrons requires a 7½-ton crane, to give lateral and transverse movement.

A telescopic arm between the crane and the betatron allows vertical positioning, and the machine may be tilted and rotated to focus rays on the desired section of the casting under inspection. Another overhead crane, of 20-ton capacity, is required for positioning the heavy armor parts.

**Radiation Protection** — For protection, the installations are housed in specially-constructed, windowless buildings with thick double walls of concrete slab spaced ten feet apart and filled with sand to a height of 20 feet.



ALL OUR SALESMEN take a 'know-your-products' course.

—Technical Briefs—

**Power:**

Generating capacity will reach 75 million kw by 1965.

With national electric-energy consumption doubling approximately every decade, vast increases in installed generating capacity will have to be made to keep pace, A. C. Monteith, vice-president, Western Electric Corp., recently told members of the Southeastern Electric Exchange at Boca Raton, Florida.

Fastest growing electric consumer is the Southeast. Such projects as the H-bomb, a new man-made firer plants, southward migration of textile plants, and general industrial growth have contributed to this growing appetite for power.

**Capacity Growing**—By 1965 the nation's total generating capacity will have risen from the present 75 million kilowatts to 178 million. To do this in the next 13 years, we will install 1-1/3 times the present total capacity, which will give us three times the installed capacity of 1948 and four times that of 1942, Mr. Monteith said.

As load concentrations increase, larger generating units will be needed. The larger the unit—be it boiler, turbine generator, or transformer—the less the overall installed cost per kilowatt. The larger the kilowatt rating of the unit, in general, the smaller is the space required per kilowatt.

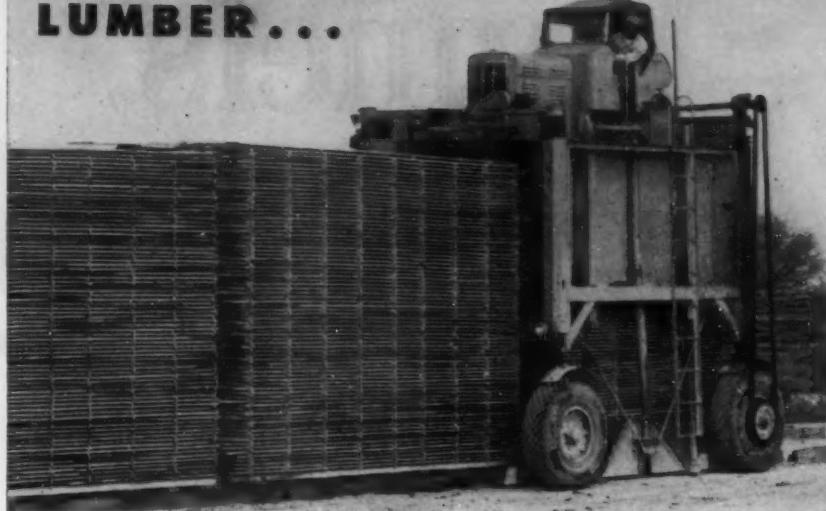
**Costs Down**—This means smaller foundations, smaller buildings, less land, all of which means money saved per kilowatt delivered. With the increases coming in larger blocks, you can press the unit size factor more and more.

A few figures will indicate what has been happening to size of electrical apparatus. The largest 3600-rpm turbine generator in service in 1941 (a non-condensing unit) was rated 65,000-kw. The largest unit in operation today is Seward No. 4, a 125,000-kw generating machine.

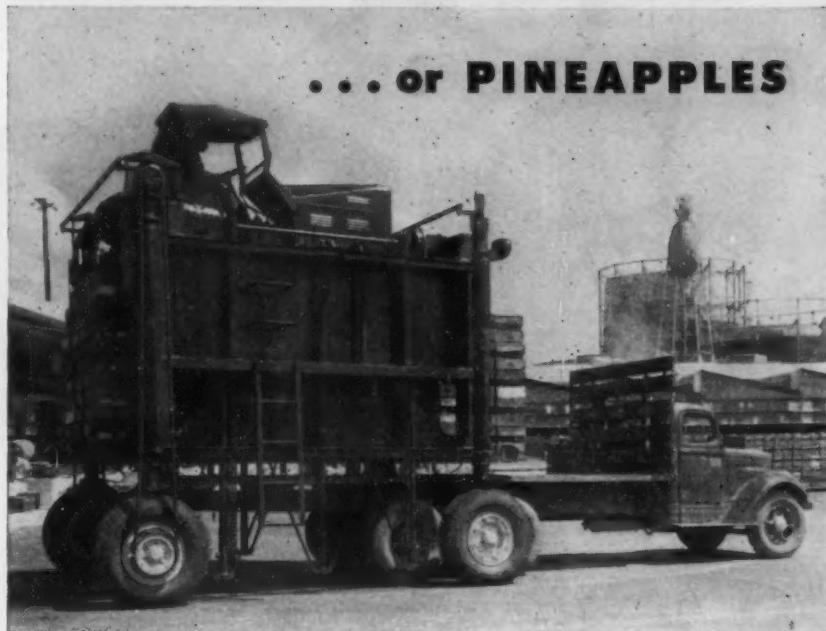
*Turn to Page 174*

May 1, 1952

**Maybe your business isn't  
LUMBER . . .**



**. . . or PINEAPPLES**



**BUT . . .** just imagine the savings you could make, the problems you could solve by handling your materials with ROSS Straddle Carriers, the most flexible and most adaptable mass material handling method known!

ROSS engineers will be glad to work with your materials handling men in exploring the possibilities of ROSS Straddle Carriers for your operations . . . there's no obligation.

Send for details on ROSS Straddle Carriers . . . 10,000 lb., 20,000 lb., 35,000 and 45,000 lb. capacities.



**THE ROSS CARRIER COMPANY**  
*Direct Factory Branches and Distributors throughout the world.*  
Miller St., Benton Harbor, Michigan, USA

# Funnels, Furniture & Fine Finishes



**FOLLANSBEE COLD ROLLED STRIP STEEL** can be fed right from the coil into high-speed machines for fabricating most anything from funnels to furniture. Moreover, Follansbee Cold Rolled Strip is furnished in a wide variety of tempers and finishes to meet most demands.

For efficiency and economy in continuous operations, you'll find it worthwhile to try Follansbee Cold Rolled Strip Steels. All are supplied in coils for automatic production engineering, with mechanical and physical specifications to fit most needs. The Follansbee Steel Representative nearest you will give you full information.

## FOLLANSBEE STEEL CORPORATION



GENERAL OFFICES, PITTSBURGH 30, PA.  
SHAMLESS TINNE ROLL ROOFING • COLD ROLLED STRIP  
POLISHED BLUE SHEETS AND COILS

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. Sales Agents—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. Mills—Follansbee, W. Va.

Follansbee Metal Warehouses—Pittsburgh, Pa., Rochester, N.Y., and Fairfield, Conn.

**Weight Lower**—Just a year ago, Public Service Electric & Gas Co. of New Jersey placed an order for one of 185,000-kw capacity, and a few weeks later the Philadelphia Electric Co. topped that with one rated 200,000 kw. Turbine-generator people have been discussing 250,000-kw units with several companies.

By comparison with the 65,000-kw machines of 1943, the 200,000-kw unit will weigh 34 pct less and occupy 30 pct less space per kilowatt. Also of interest, the new single-shaft, 3600-rpm, 150,000-kw generating units will weigh 1 million lb less than the 150,000-kw cross-compound unit purchased 5 years ago and now running about 18 months.

### Optical Comparator Use Shown

A new, full-color 16 mm sound movie, "What's the Difference?" has been released by Jones & Lamson Machine Co. The film, running 21 minutes, tells how the optical comparator may be used in inspection work. The film is available to schools, technical associations and manufacturers. Application for bookings may be made to the company at Springfield, Vt.

### Chemical Reactions Studied

A critically evaluated compilation of numerical data on rates and rate constants of homogeneous chemical reactions has been prepared by the National Bureau of Standards.

The publication, "Tables of Chemical Kinetics, Homogeneous Reactions," stresses facts gathered experimentally and excludes data based on interpretation. Tables presented are a cooperative effort of the National Bureau of Standards, the Committee on Table of Constants of the National Research Council, and Princeton University. Copies are available from the Government Printing Office, Washington 25, D. C., at \$4.00 per copy.

Turn to Page 176

THE IRON AGE

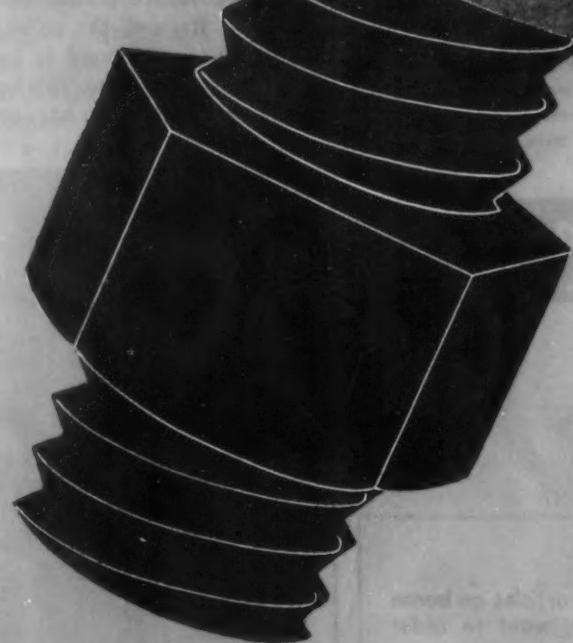
r ago,  
as Co.  
er for  
and a  
elphia  
th one  
enera-  
ussing  
l com-

55,000-  
0,000-  
ss and  
r kilo-  
e new  
000-kw  
1 mil-  
000-kw  
ased 5  
about

TOWN  
sound  
rence?"  
ones &  
e film,  
ow the  
used in  
s avail-  
ssociate-  
Appli-  
e made  
eld, Vt.

d  
compila-  
n rates  
geneous  
en pre-  
reau of

les of  
geneous  
gathered  
es data  
Tables  
e effort  
f Stan-  
able of  
nal Re-  
Princeton  
available  
Printing  
C., at



Many makers of every type of earthmoving equipment consider Sterling Bolt Company a primary source of bolts, nuts and screws . . . dependable fasteners to build rugged, superior products.

Many purchasing agents (not only in that industry but in any manufacturing activity using nuts and bolts in volume) specify Sterling Bolt products as a step in efficient production planning.

For 30 years Sterling Bolt Company has been helping industry make better products for more people.



# STERLING BOLT CO.

GENERAL OFFICES: 403 W. ERIE ST., CHICAGO 10, ILLINOIS  
CINCINNATI, INDIANAPOLIS, MILWAUKEE, ST. LOUIS



With built-in accuracy, and stamina beyond average requirements, the unique feature of independent selection of speed, feed, and indexing makes possible the delivery of a selected accuracy at higher speed, or a selected speed with greater accuracy than can be achieved by other machines. We are proving this daily. Complete information is offered in our free Bulletin No. H-491. Write for it now!

THE  
*Hamilton* TOOL  
COMPANY  
1856 SO. NINTH STREET • HAMILTON • OHIO • U.S.A.

### ALLOY TROUBLE?

If you have missed the special Iron Age series of five articles on boron steel which appeared last July and August you may want to order a reprint.

A 30-page reprint booklet covers the following:

1. Boron steel alternates for standard grades.
2. Advantages and limitations of boron steels.
3. Hardenability charts.
4. Case studies of boron steel use in plants making gears . . . pinions . . . springs . . . bolts . . . axles.

**A limited quantity of reprints is still available.** Price 50¢ each.

Address:  
Reader Service Dept.

*The Iron Age*

100 East 42nd St., New York 17, N.Y.

### Polishing Aluminum:

Compound gives uniform sheen without abrading surface.

How to polish aluminum without materially reducing the thickness of the metal has been licked at Ryan Aeronautical Co.

Fearing loss of vital 2S aluminum coating, Boeing Airplane Co. requested that conventional polishing agents not be used on the C-97 fuselage sections built by Ryan for the new big ships.

Ryan engineers developed a new non-abrasive polish. The polish removes vari-colored stains from aluminum and provides a uniform sheen approaching mill finish appearance.

**No Abrasion**—This is accomplished without abrasive action which might thin the 2S aluminum coating over the 24ST dural base. The stains which the new polish attacks are surface mars and are not the corrosion type which requires abrasive polish.

Since its use, the polish, Raco 220, has been found to have an anti-corrosion value. This has been demonstrated on the huge external



MILL SHEEN is imparted to aluminum fuselage without abrading surface. Polish was developed by Ryan engineers.

### Technical Briefs

fuel tanks being built by Ryan for combat planes. The new polish is applied to the external skin surfaces, particularly along the seam welds.

Inhibitor—It was found the polish removes copper picked up from the rolls of the seam welder. This inhibited galvanic corrosion by copper.

The compound contains 4 lb of 400-mesh silica to the gallon, suspended in a water solution. An organic suspending agent is introduced to keep the polish from "packing." Phosphoric acid in the polish passivates the aluminum and helps prevent formation of black smut, such as occurs in most polishes. A buffer of disodium phosphate in the polish reduces the corrosive power of the phosphoric acid. Aluminum samples, exposed to the polish for a month, showed no signs of tarnishing or loss of weight.

### Beryllium Has Toxic Properties

Melting, machining and general handling of beryllium and beryllium alloys can be dangerous without adequate ventilation, according to a recent issue of "The Frontier," publication of Armour Research Foundation. Beryllium and its compounds are extremely toxic to some people, particularly attacking the lungs. Care should be taken to prevent buildup of beryllium-containing particles in the air.



Nice, handy transformer. You can mount it right next to the job.

May 1, 1952

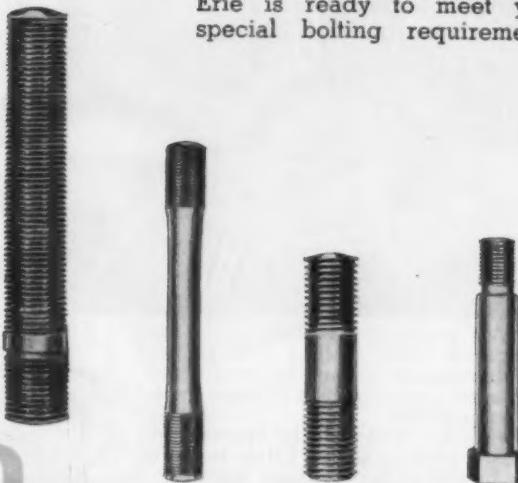
## For DEPENDABILITY IN TRANSPORTATION



### The Correct Fastener for the Job

These Erie bolts have at least one thing in common—they are designed to hold against maximum strains imposed by pressure, temperature, or corrosion. They differ in material, shape and threading as the job directs. For 38 years, we have geared our plant to manufacture these unusual high quality bolts to exacting specifications.

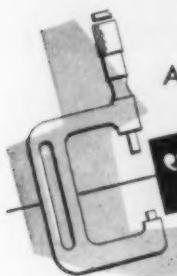
This broad experience backed by a high desire to be of service to you is your assurance that Erie is ready to meet your special bolting requirements.



**ERIE BOLT and NUT CO.**  
ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS  
ALLOYS • STAINLESS  
CARBON • BRONZE

Representatives in Principal Cities.



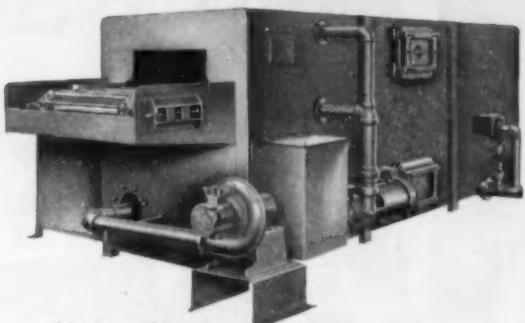
ANOTHER

"JOB ENGINEERED"

# ALVEY-FERGUSON

WASHING MACHINE FOR INDUSTRY

For a discussion of latest metal parts and products cleaning methods, write today!



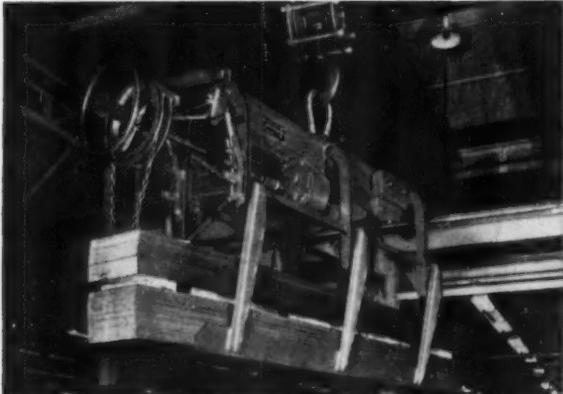
WHEN a washing machine is needed to perform an unusual operation, it's almost certain that A-F Engineers will be called upon to build it! . . . The A-F Washing Machine shown here was built especially for removing sand from steel foundry flasks. A

special feature is the Slo-Flo Tank (not shown in photograph) which settles the sand out of the cleaning solution before it reaches the screening tank for recirculation. Flasks are cleaned faster . . . and each flask is uniformly clean!



**THE ALVEY-FERGUSON COMPANY** 565 Disney St. Cincinnati 9, Ohio  
OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

## Wide or Narrow...



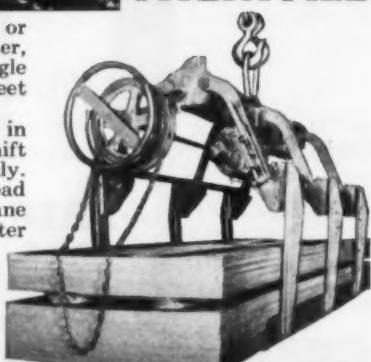
Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.

Bulletin SL-28 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

1 C-F  
LIFTER  
HANDLES  
THEM ALL



**CULLEN-FRIESTADT CO.**

1303 South Kilbourn Avenue • Chicago 23, Illinois

### —Technical Briefs—

#### Tool Failures:

Grinding may kill more than 50 pct of effective tool life.

More than 50 pct of effective tool life may be killed in the grinding process under present-day shop practice, K. R. Blake, vice president, Metalloid Corp., recently told the American Society of Tool Engineers at Chicago.

This figure applies to dies, punches, rolls and all other types of frictional tools. It includes high speed steel, carbide, and every type of tool, although some types are more susceptible to this destructive action than others, Mr. Blake pointed out.

**Hardness Affected** — When a high speed steel tool, for example is taken from heat treat, it will show a hardness of RC 64 to RC 66. The tool blank is supplied to the grinding department where it is rough and finish ground to conform to the blueprint.

When the tool is finished and ready to go to the machine, its hardness is on the average, below RC 50. Depth of the annealed layer will range from 0.002 to 0.003 in. to as much as 1/16 in., depending on the severity of the grinding operation. This condition exists regardless of the method of grinding, lapping or honing used.

**Grinding Method** — Grinding of high speed steel tools with at least 150-grain wheel with a bond hardness of H in a vitrified bond was recommended. A straight grinding oil or a true solution able to restrict transference of energy from the dull grains in the wheel to the work piece should be used.

Hardness of the tool is maintained and tool life is increased 200 to 300 pct.

Moreover, the amount of stock removed from the tool on each successive regrind will be considerably less than with conventional grinding methods. Both roughing and finishing can be done with one wheel in one operation. Two separate operations are not necessary.

Turn to Page 182

THE IRON AGE

*Perforated*  
**METALS and MATERIALS**

No Job Too Small—  
None Too Large  
at  
**H & K**

CATERING TO THE NEEDS of every customer—large or small—has been the guiding principle at H & K ever since 1883. Your order may call for one sheet of special perforations . . . or it may be for several thousand in a standard pattern. Regardless of its size, H & K treats every order with equal attention, well knowing that proof of real success lies in the long and continued satisfaction of H & K customers.

Also Remember H & K Grilles  
... for Beauty . . . for Utility  
... FOR LIFE!

**FLEXIBLE FACILITIES**  
**PROMPT SERVICE**  
**LOW COST**

**H & K Perforated Materials . . .** include all currently available metals in thicknesses from tissue paper thin to 1" steel plate, or equivalent—or non-metals such as plastic, plywood, rubber, fabrics, etc., in sheet, plate or coil form.

**H & K . . .** your headquarters for screens, filters, strainers, grilles, etc. Write at once for complete information.



**COLD HEADING EQUIPMENT**  
Up to  $\frac{1}{8}$  inch

**AUTOMATIC SCREW MACHINES**  
B & S #00-Conomatic 3 1/2"

**EYELET STAMPING**  
Up to 3" drawn shell

**DIAL SCREW & SCREW MACHINE PRODUCTS**

AN3—AN20  
AN21—AN26  
AN42—AN49  
AN73—AN81  
AN130—AN170  
AN172—AN186  
AN255  
AN276  
AN386  
AN392—AN402  
AN490  
AN500—526

Aircraft Bolts  
Clevis Bolts  
Eye Bolts  
Engine Bolts  
Tombuckles  
Close Tolerance Bolts  
Round Head Necked Screw  
Ball & Socket Joint  
Threaded Taper Pin  
Flat Head Pin  
Rod End  
Complete Line Machine  
Screws—Alloy and  
Commercial Steels—  
Philips and regular  
head

AN555  
AN563  
AN774—AN775  
AN780  
AN785—AN786  
AN800  
AN801  
AN803

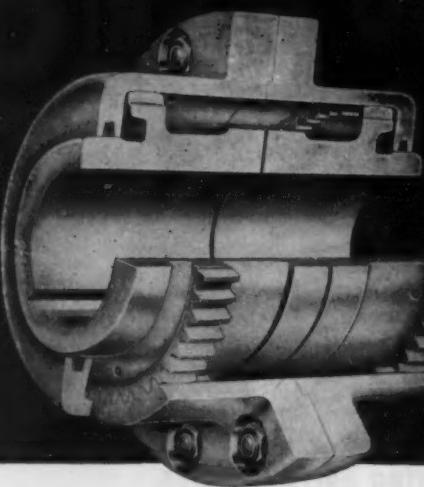
Shoulder Bolt  
Set Screws  
Universal Bolt  
Union  
Coupling  
Cane  
Connection  
Nut

AN806  
AN807  
AN814  
AN815  
AN816  
AN817—AN818  
AN819  
AN820  
AN832  
AN840—AN841  
AN847, AN870, AN871,  
AN872, AN873  
AN875  
AN893—AN894  
AN895  
AN896  
AN897  
AN898  
AN899  
AN900  
AN901  
AN912  
AN913  
AN918  
AN920  
AN924  
AN929  
AN933  
NAS8  
Bolts, Nuts, Screws & Rivets  
AN101001—AN126274

Plug  
Adapter  
Plug  
Union  
Nipple  
Nut  
Sleeve  
Cap  
Union  
Adaptor  
Flanges  
Collar  
Bushing  
Plug  
Reducer  
Union  
Nut  
Cap  
Plug  
6 DIGITS

**DIAL SCREW PRODUCTS CO., INC.**  
32-17 — 58th St., Woodside, N.Y.C.

# POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

## FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY

WOODBERRY, BALTIMORE, MD.

TO YOUR SPECIFICATIONS

# GRiffin

## COLD ROLLED STRIP STEEL

$\frac{1}{2}$ " to 19" Wide  
.002 to .500 Thick

Desired quality for forming and drawing.

Consult with us on your next cold rolled strip steel requirements.

### SALES AGENTS:

WM. H. LEONORI & CO., Inc., 30 Howard St., New York 13, N.Y.; D. S. WEGENER, 313 Stephenson Bldg., Detroit 2, Mich.; CHARLES L. LEWIS, 1335 Market St., San Francisco 3, Cal.; J. J. LAMBERT, 323 Huntington Ave., Buffalo, N.Y.; RICHARD A. WADE, Hamilton Bank Bldg., Chattanooga 2, Tenn.

**CENTRAL STEEL & WIRE COMPANY**  
13400 North Mt. Elliott  
Detroit 12, Mich.

3000 West 31st St.  
Chicago 80, Ill.

Box 148 Annex Station  
Cincinnati 14, Ohio

**GRiffin MANUFACTURING CO. • ERIE, PA.**

# Now you can produce YOUR OWN GAS with **VAPOFIER**



## OIL GASIFYING UNITS PRODUCE GAS FOR ALL INDUSTRY

Vapofier converts light fuel oil into a gas that is suitable for any industrial heating process using a conventional gas firing system or can be used to convert your present indirect oil fired equipment to an efficient direct fired principal.

## USE AS STANDBY EQUIPMENT

Vapofier gas generating units provide a most suitable arrangement as standby for natural gas. Same piping, controls, burners and safety devices are utilized on both gas or oil fired equipment. Change over to and from gas is made without loss of flame at the burners in a matter of seconds. Various sizes and capacities to fit your needs.

## WRITE FOR FREE 4-PAGE BOOKLET

### VAPOFIER CORPORATION

10330 S. Throop St. • Chicago 43, Illinois

Please send me without cost or obligation free booklet "Make Your Own Gas with Vapofier."

Name ..... Title .....

Firm .....

Address .....

City ..... Zone ..... State .....

SEND COUPON TODAY!

## Technical Briefs

sary. Overall grinding time per tool will be reduced by approximately 50 pct.

**Carbide Tools**—In grinding carbide tools, the same general condition exists except that finish grinding is usually done with diamond wheels. Here, action of the coarse-grain wheel raises internal energy so the tool is very susceptible to impact failure.

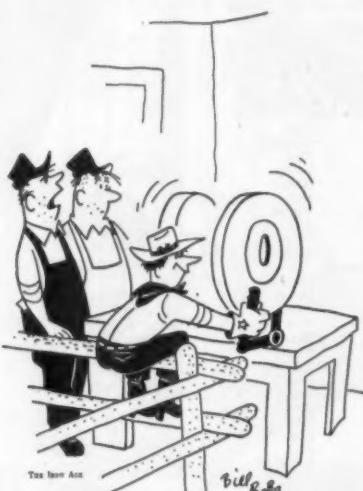
### Drop Hammer:

Big steam powered forging hammer will turn out aircraft sections.

Big aircraft sections will be forged on a 25,000 lb steam powered drop hammer recently installed at the Vernon Plant of the Aluminum Co. of America. The big hammer, reported to be the world's largest, was installed by MacIsaac, Menke & Roach, Inc., of Los Angeles.

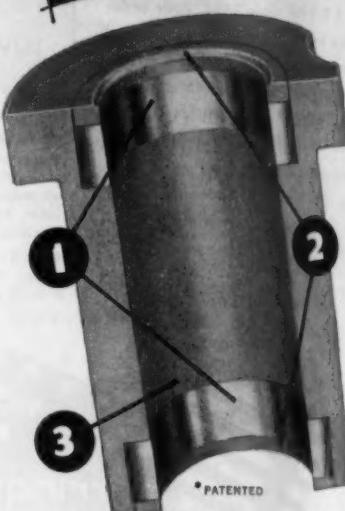
Standing approximately 18 ft above floor level, the hammer is foot-pedal operated by a 3-man crew. A 12-in. intake line feeds steam into the overhead cylinder, lifting and dropping the weight.

**Absorb Vibration** — Hammer, anvil and base weigh 75 tons and the entire mass rests on a 24 ft square concrete inertia block located 21 ft under floor level and suspended on a network of steel beams. Ends of the beams are supported by 64 specially designed units which hold up 20,000 lb.



Turn to Page 184

**DOES IT BETTER!  
AND LONGER!**



**MEYCO**  
CARBIDE INSERTED  
DRILL JIG BUSHINGS

There are three simple reasons why MEYCO Carbide Inserted Bushings have won an enviable reputation for themselves:

1. Cemented tungsten carbide inserts at the points of wear increase the life of the bushings an unbelievably long time.
2. Hardened steel rings above and below the carbide inserts protect both drill and carbide from the shock of impact.
3. Body of hardened special alloy steel, combines the best features of steel bushings with the best features of carbide.

The story is simple: MEYCO bushings last as long as solid carbide bushings in most cases at costs that come close to the prices of ordinary steel bushings. And on top of that—they will increase the life of drills and fixtures, maintain accuracy much longer and solve extra tough production drilling problems. Made to A.S.A. Standards. For full information write for catalog No. 31.

Manufacturers of precision tools since 1888



THE IRON AGE

PROMPT DELIVERIES  
WITHOUT PRIORITY

WORLD FAMOUS

# Raskin Presses

They're available now for your selection! Illustrated here are just a few of a complete range of top quality presses from one of Europe's leading manufacturers! We're ready to meet your requirements with this ruggedly built equipment of the most modern design.

You can place your confidence in MOREY . . . Builders, rebuilders and importers of fine machinery for more than 40 years.



## CHECK THE FEATURES OF THESE RASKIN PRESSES

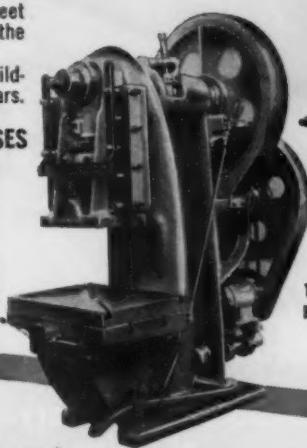
- Fully seasoned high tensile castings.
- Crankshafts of nickel-chrome Molybdenum steel with a 126,000 lb. tensile and 16% elongation.
- Extra long gibs for longer die life.
- Protected from overload by shear pins in the clutch.

Descriptive literature and prices on request.

200-ton Double Crank  
Straight Side Press from  
30 to 500 tons.



110-ton Heavy Duty  
Geared Press, O.B.I.



120-ton Geared End Wheel  
Press. From 20 to 300 tons.

**MOREY**  
*...for more value!*

**MOREY MACHINERY CO., INC.**

Manufacturers • Merchants • Distributors

410 BROOME ST. • NEW YORK 13, N. Y.

TELEPHONE: CANAL 6-7400

CABLE ADDRESS: WOODWORK, N. Y.



industrial

and

ornamental  
perforations



steel available  
from Accurate's stock

Accurate's wide selection of perforating dies for every purpose...long-range savings through speedy low-cost service, plus quality...assures you of top value. Engineering consultation service yours for the asking. For help in choosing the proper dies and specifications for your needs see Accurate's catalog. Send for your FREE copy today!

### SERVING THESE INDUSTRIES:

AIRCRAFT • AUTOMOTIVE • BUILDING CONSTRUCTION • COMMUNICATIONS • ELECTRICAL EQUIPMENT • FOOD PROCESSING • HEATING • MINING • RADIO AND RADAR • RAILROADS • SHIP BUILDING • STEEL • LAUNDRY EQUIPMENT • VENTILATING

### IN THESE MATERIALS:

ALUMINUM • BRASS • BRONZE • COPPER • LEAD • MONEL METAL • STEEL • STAINLESS STEEL • MASONITE • PLYWOOD • PAPER • CLOTH

**ACCURATE**  
perforating company  
1101 S. KEDZIE AVENUE • CHICAGO 12, ILLINOIS

## ELECTRIC FURNACE C STEEL CASTINGS

### Offset Increasing Production Costs.

These clean, true-to-pattern steel castings give you Uniform Structure—Efficient Distribution of Metal—A Wide Range of Mechanical Properties to fit your specific needs—Minimum of Machining—Ease of Assembly—Dimensional Stability for better fit and better performance—and a Toughness and Fatigue Resistance that provide for longer life, less replacements.

We specialize in this type of steel castings. Efficient controls throughout our plant assure consistent uniformity, thorough dependability and a product that will prove to be economical for use in your equipment whether it be ships, turbines, railroad equipment or what-not.

**CRUCIBLE STEEL CASTING CO.**  
LANSDOWNE,  
PENNA.

## Technical Briefs

### Titanium:

Forming characteristics of titan, our metal studied.

Titanium—the \$15 a lb glamour metal—is nature's paradox. With an extremely high melting point for its weight—higher than steel—it still will not withstand continued use at high temperatures. It is never found free, instantly combines with other substances when molten, yet will not weld with any other metals by known processes, engineers say.

Titanium retains its strength up to about 800°F. It weighs 56 pct as much as steel and approaches the best steels in strength. Some titanium alloys provide 175,000 psi tensile strength and new types with 200,000 psi are being developed. It is the only metal known to have an endurance strength consistently in excess of 50 pct of its tensile strength.

**Forming Studied**—In forming studies at Ryan Development Laboratories, flat sheet was formed to complex shapes to shroud high temperature exhaust systems built for Piasecki HUP-1 helicopters. This part operates at a temperature of 400° to 500°F and appears to be an ideal application which combines the weight-saving and heat-resisting qualities of the metal. Also, it involves severe forming and resistance welding.

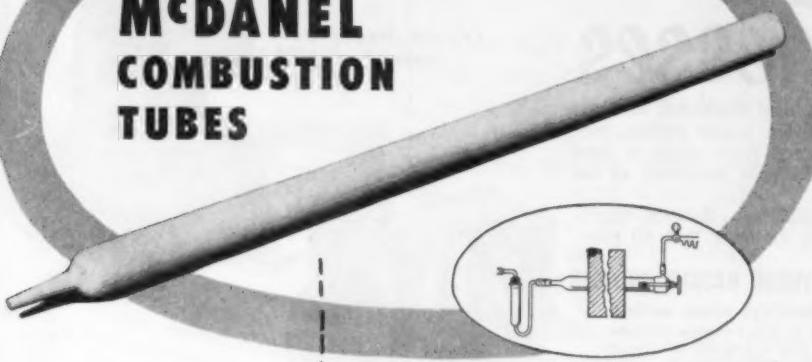
Little information is available on production forming of titanium. It made its commercial debut in 1946 and only 60 tons of the metal were refined in 1950. An experimental production procedure was set up to determine the behavior of titanium when welded, formed and heat-treated. To check the effectiveness of cold forming plus annealing and hot working of titanium, a number of sheets of 0.018 in. and 0.037 in. metal were used.

**Deformation Measured**—A spherical cavity was machined into a steel plate. Diameter of the cavity was  $\frac{3}{4}$  in. and depth  $\frac{7}{32}$  in. By measuring total deforma-

*Turn to page 186*

**LAY IN A SUPPLY OF . . .**

### McDANEL COMBUSTION TUBES



**FEWER FAILURES: MORE DETERMINATIONS**

**McDanel Refractory Porcelain Co.**

Beaver Falls . . . Penna.

**McDANEL**

**PORCELAIN SPECIALTIES**

Your Porcelain requirements—large or small  
—are considered important by McDANEL.

## Collapsible pallet-box plus Gerrard Steel Strapping helps cut shipping costs!

The collapsible pallet-box shown here carries 3450 lbs. of front axles. Gerrard Round Steel Strapping reinforces all six sides of the container, keeping the box rigid and the contents safe until they reach their destination. When the box is unloaded and all straps removed, the box may be quickly collapsed and its members strapped together for return shipment. Costly shipping space is thereby conserved.

Call a Gerrard engineer for detailed information about how the Gerrard Method of Strapping can help you cut shipping costs, speed up production line tying, eliminate unnecessary containers or give stronger reinforcement to cartons, boxes, crates and pallets. Write for a free copy of the *Blue Book of Packaging*.

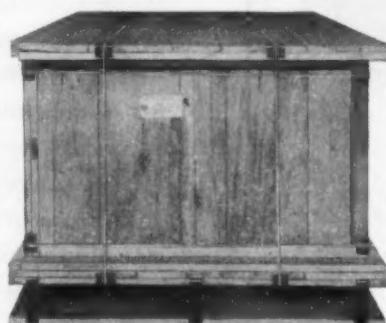


Photo courtesy of International Harvester Company, Industrial Power Division.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL COMPANY  
4705 South Richmond St., Chicago 32, Ill.

**U-S-S GERRARD ROUND STEEL STRAPPING**   
**UNITED STATES STEEL**

## SAFETY SWITCH

THAT SHUTS OFF FUEL  
IF BLOWER FAILS



Protection  
for  
Oil Burners  
•  
Industrial  
Ovens  
•  
Power  
Gas Burners

### WHAT IT DOES

The Dewey Safety Air-flow Switch protects against opening of fuel valve until fan is up to speed.

Insures purging of furnace before fuel valve opens. Closes fuel valve if fan slows up or stops. Flashes danger signal if fan or fuel stops. Safeguards against danger from gas fuel failure when used in connection with safety shut-off valve.

Thousands sold. Factory Mutual Approved. Standard equipment on leading products. Write for prices and literature.

DEWEY GAS FURNACE CO.

100 E. Baltimore

Detroit 2, Mich.

FREE  
CIRCULAR

*Dewey* SAFETY AIRFLOW SWITCH

Our Line  
Light and heavy  
machinery  
for all classes  
of sheet  
metal plate  
and structural  
work...

8' x 1/4" SHEAR, 30" GAP.

11' x 1/4" SHEAR, 24" GAP.

BERTSCH & COMPANY  
CAMBRIDGE CITY INDIANA

## DON'T SCRAP IT!

LET "GLOVCO"  
RECONDITION IT

(LEATHER OR FABRIC)

- DUST COLLECTOR BAGS
- CONVEYOR BELTING
- TARPAULINS
- DROP CLOTHS
- FILTER PADS

At a mere fraction the cost of replacement, we clean and professionally repair these and many other items, restoring them to new usefulness. Our pick-up and delivery plan in most industrial areas eliminates mechanical difficulties making this reconditioning plan work smoothly and to your complete advantage.

DIRTY WORN  
WORK GLOVES  
RECONDITIONED  
LIKE NEW



BEFORE

AFTER

Our work glove reconditioning plan includes: pick-up, cleaning and sterilizing; repairing, reshaping, pairing, packaging and delivery. Users of the service record savings up to 49% in work glove costs. We will be glad to demonstrate this service at no cost to you.

U.S. INDUSTRIAL GLOVE CORP.  
9340 Rosedawn Avenue,  
Detroit 4, Michigan

Please send me complete details on your  
RECONDITIONING SERVICE.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City & State \_\_\_\_\_

U.S. INDUSTRIAL GLOVE CORP.  
Representatives in all industrial areas.

**Greater Tonnage  
Per Edge of Blade**

**A**

**AMERICAN  
SHEAR KNIFE CO.**  
HOMESTEAD - PENNSYLVANIA

**Technical Briefs**

tion possible after forcing the titanium into the cavity with a steel ball, using an impact load, a quantitative evaluation of annealing and pre-heat treatments was obtained. Results are shown in the table.

Tests indicated that either alternate cold forming and annealing, or hot forming would be

**TITANIUM FORMING RESULTS**

Deforming Temp.	Treatment	Deforming Characteristics
Room	None	Cracked at 50 pct deformation
Room	Deformed 50 pct of possible, annealed 1 hr at 1170°F Deformation completed	No cracking
Room	Deformed 50 pct of possible, annealed 40 min at 1170°F	No cracking
Room	Deformed 50 pct of possible, annealed 20 min at 1170°F Deformation completed	Cracking appeared imminent
450°F	Previously heated to 1300°F	Cracked when deformation was nearly complete
750°F	None	Cracked at 75 pct deformation
1000°F	None	No cracking
1300°F	None	No cracking

feasible. If cold forming and annealing are used, the point at which the part should be removed from the die is critical.

**Hot-Forming** — In hot-forming procedure, the part was placed in one end of the body half-stamping die, heated to medium red heat and deformed almost to completion. The part was then reheated and deformation completed. No springback occurred.



Wow! That makes the fifth time that dame's walked by here today.

**Spotwelding** — Good spotweld results were obtained in spotwelding titanium to itself, with machine settings which produced penetrations from between 70-90 pct. Shear values were approximately 650 lb for the 0.018 in. commercially pure titanium and 1800 lb for 0.037 in. combinations. No success was experienced in spotwelding titanium to other metals.

Stainless steel forming techniques can probably be adapted to fabrication of titanium parts similar to the Piasecki shroud. The metal should be deformed at temperatures between 800° and 1000°F, preferably closer to the maximum temperature.

**Lead Dies Not Practical** — Although lead dies are not practical, because of the lead pick-up, steel or cast iron dies should prove satisfactory. Heated dies would be desirable and economic for large-run production. Use of a controlled atmosphere furnace would prevent the formation of most scale due to heating.

**Weight Saver:**

Foam plastic material takes place of ribs in plane control surface.

Airplane control surfaces without ribs and with a minimum of rivets are now possible, according to T. E. Piper, chief process engineer of Northrop Aircraft, Inc.

Northrop engineers have developed a method of using Styrofoam, a hard plastic foam, as an inner "filler" for control surfaces, and by overall adhesion, are able to eliminate the need for 80 pct of the rivets now used in control surfaces.

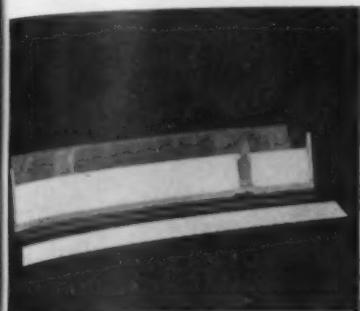
**Expanded 40 Times** — Styrofoam, a development of the Dow Chemical Co., is produced by expanding polystyrene approximately 40 times into a snow-like multicellular foam.

Use of Styrofoam was considered because of tremendous savings in weight, and because of its ability to eliminate vibration

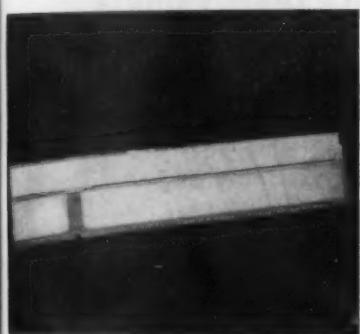
by filling the voids within control surfaces. This lack of vibration makes possible much higher speeds.

**Bond Developed**—Plant men developed a metal-plastic adhesive, which is a modification of existing synthetic resins, for bonding Styrofoam to sheet metal.

The adhesive, providing a high-strength bond, may be brushed or



RIVETS ARE OUT and 80 pct fewer rivets are used in new construction method at Northrop Aircraft, Inc. Foam plastic is bonded to control surfaces. Control surface is shown with center spar and top core removed.



HIGHER SPEEDS are possible through savings in weight and damping of vibrations attained with foam plastic filler. Complete control surface assembly is shown.

sprayed on. It is applied to all mating surfaces, then sealed by pressure contact.

**Vacuum Needed**—To make the pressure contact, a transparent sheet of polyvinyl alcohol is made into a bag large enough to cover the control surface containing the Styrofoam. By pump, air is exhausted from the transparent bag. The vacuum provides necessary pressure for contact and sealing the adhesive to the working surface. During recent tests, areas as large as 13 x 3 ft have been sealed by this method.

# You Can Judge a Machine by the Calibre of its Users!

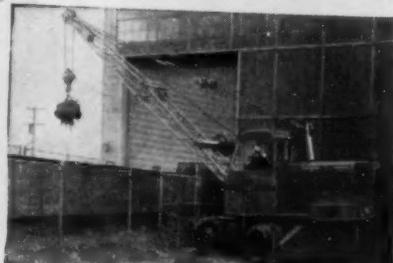
In every section of the country...in every branch of industry...you will find satisfied owners and operators of UNIT equipment. Surely, such widespread popularity must be deserved. Why not investigate? Write for novel "TV" brochure that depicts the complete Unit line.

## These Prominent Firms Use UNIT Cranes and Shovels

- Allis-Chalmers Mfg. Co.
- American Chain & Cable Co.
- Baker Wood Preserving Co.
- Burroughs Adding Machine Co.
- Campbell Soup Company
- Carnegie-Illinois Steel Co.
- Chicago, Milw., St. Paul & Pac. R.R.
- Chrysler Corporation
- Consolidated Vultee Aircraft
- Diamond Match Company
- Dow Chemical Company
- Frigidaire
- General Electric Company
- General Motors (Pontiac Div.)
- Goodyear Tire & Rubber Co.
- Great Lakes Steel Corp.
- International Harvester
- Niagara-Mohawk Power & Light
- North Carolina Pulp & Paper
- Northern Natural Gas Co.
- Oliver J. Olsen Shipbuilding
- Packard Motor Car Company
- Pennsylvania Railroad
- Pittsburgh Plate Glass Co.
- R. J. Reynolds Tobacco Co.
- Sacony Vacuum Oil Company
- Shell Oil Company
- A. O. Smith Corporation
- Universal Pictures, Inc.
- Weyerhaeuser Timber Co.

### For BIG Lifting Jobs

UNIT 1520T mounted on a 3-axle tandem drive crane carrier, designed exclusively for heavy duty truck crane operation. Sturdy, efficient truck engine provides fast mobility. A separate engine in upper structure furnishes dependable power for lifting.



UNIT 357 Self-propelled Mobile Crane with Magnet Lifting Scrap Iron.



UNIT 357 with Clamshell for Lifting Bulk Materials.



UNIT 357 Crane used for a Typical Industrial Lifting Job.

UNIT CRANE & SHOVEL CORP.

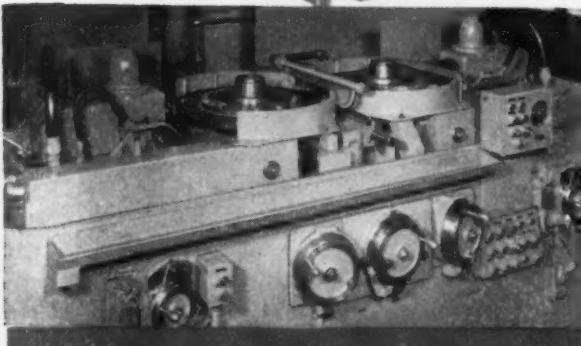
6517 W. Burnham Street • Milwaukee 14, Wisconsin, U. S. A.



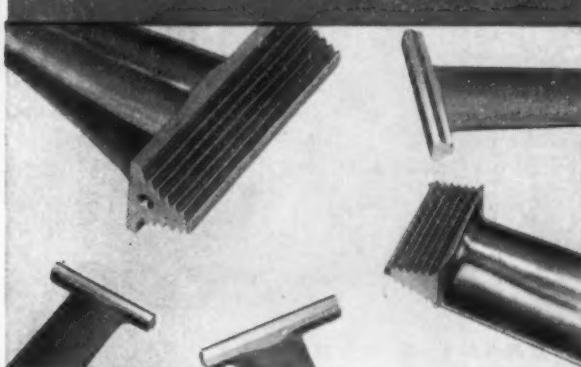
SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHERS • MAGNETS

A 7006-2/3PC

# Production-Proved EX-CELL-O Machine Grinds Jet Blade Roots



The machine uses two wheels to grind both sides of the root form simultaneously.



Dovetail and pinetree forms, in various sizes, are ground from rough forgings.

## PRECISION TWO-WHEEL FORM GRINDER GIVES FINE FINISH, HIGH PRODUCTION

This production-proved Ex-Cell-O Precision Two-Wheel Form Grinder finishes roots of jet engine blades with speed, economy and precision. It is fully automatic except for loading, unloading and pushbutton starting.

Two 24-inch diamond-dressed grinding wheels are used, the work reciprocating between them. Dovetail or pinetree forms of various sizes can be ground economically from semi-finished and rough forgings. Work reciprocation, wheel feed to finish size, coolant control, unclamping, wheel retraction, and wheel dressing are all done in an automatic cycle.

Controls are so simple that unskilled operators can do this high precision work. For more information and complete specifications contact Ex-Cell-O in Detroit.



**EX-CELL-O CORPORATION**

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS  
RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT  
AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

## Steel Won't be Caught on Wage Board's \$3 Bait

**Industry can't afford \$3 "bargain" for 26¢ wage increase  
... Sawyer would compound legal action if he granted boost  
... Some see reduced output, hot competition in second half.**

Steel companies won't bite on the \$3-per-ton price bait the government is dangling in the hope of landing a whopping wage increase for steelworkers. The reason is obvious: Granting the full wage increase of 26¢ an hr (30¢ by industry figures) recommended by the Stabilization Board would set steel firms \$12 a ton, or four times the amount the government is using for bait. Steel people will continue to insist they can't afford that kind of "bargain."

The \$3-per-ton price "relief" comes in the form of cost-price adjustments under the Capehart amendment to the Defense Production Act. It covers higher costs between Korea and last July 26. The industry is entitled to it under law. It has nothing to do with price relief to offset any current wage increase to be granted.

**Helping Push**—Normally, industries eligible for price adjustments under the Capehart Amendment take the initiative in asking Office of Price Stabilization to issue a specific price regulation. But the steel industry has refrained from asking Capehart adjustments. Steel people feel that accepting such increases would weaken their case for higher prices to offset higher wages recommended by OPS. Washington officials and Union Chief Phil Murray would be quick to capitalize on this. In the public mind the industry would have had its price relief.

The OPS regulation authorizing Capehart adjustments means that the Administration is willing to go unusual lengths—foisting an in-

adequate price increase on the industry—in order to force a big wage package down its throat.

**The Outlook**—It is known that at one time the government was prepared to offer a price increase of more than \$3 a ton—possibly \$4.50 a ton. This was withdrawn. A total price rise of \$5 to \$5.50 a ton may finally be granted to partly offset cost of the wage package.

Though President Truman is expected to continue to force the issue through his "stabilization" officials, the steel industry will drag its feet on accepting a price increase it is convinced is inadequate.

**Legal Precedent**—It has been suggested that Commerce Secretary Sawyer might put the price increases into effect, since he technically operates the steel companies as a result of President Truman's seizure order. This is to be doubted. Such a move would compound legal actions which companies are already bringing against the government.

On the legal front wide interest attends a Federal District Court decision of history-making importance. Major steel firms are seeking to prevent Mr. Sawyer from raising steel wages during seizure. From this suit is expected to come a ruling on the so-called "inherent powers" of the President.

**The Charges**—Steel companies charge that seizure was unnecessary as well as illegal. That President Truman refused to invoke a statute which Congress legislated

for just such emergencies. This would be the 80-day injunction clause of the Taft-Hartley Act which Congress passed in 1947 after long debate. Since then Mr. Truman has tried repeatedly to get the act modified without success.

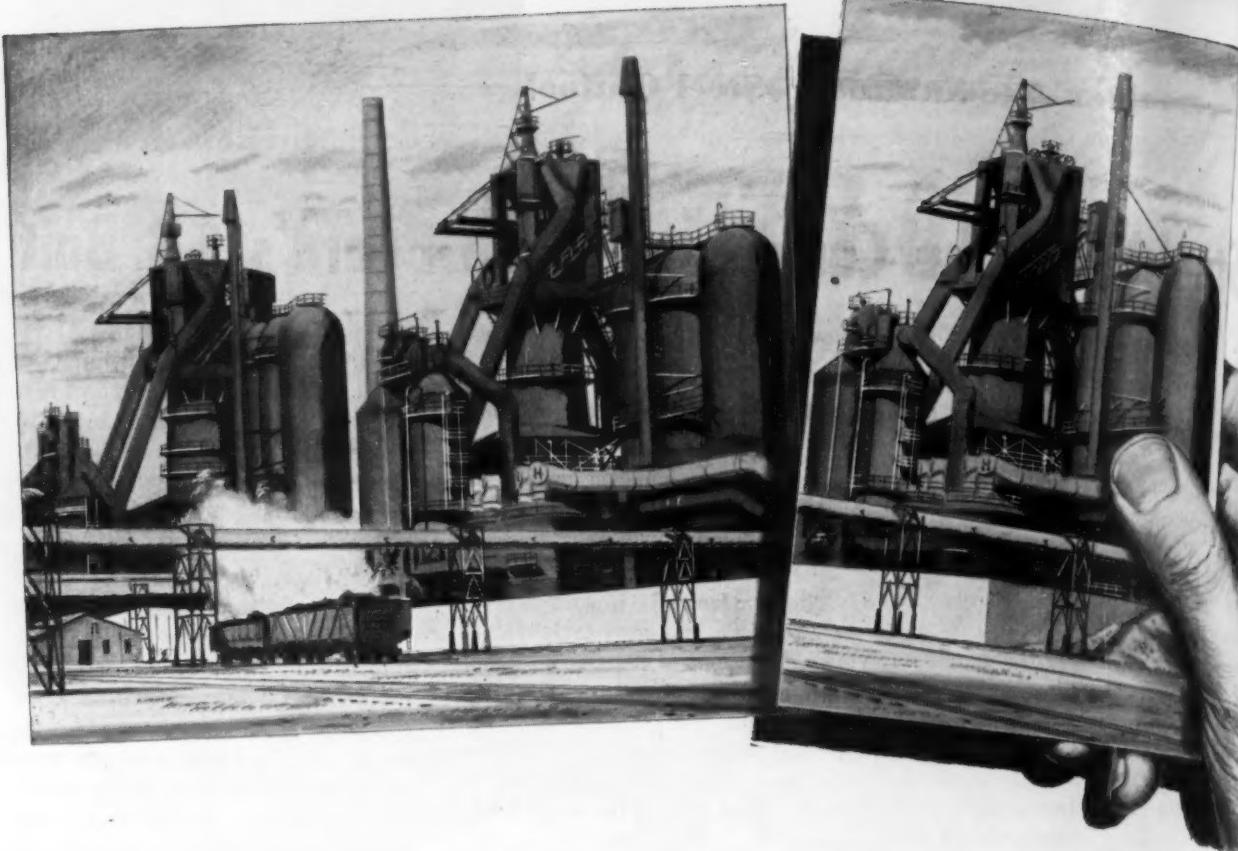
Although the steel market is definitely tighter than it had been in recent weeks, consumers aren't impressed. Their inventories remained relatively intact through the short shutdown. They are generally sitting tight with an adequate supply of steel. While products such as carbon bars and heavy plates and structurals are tight in all areas, hunger is gone from the market.

**See Easy Supply**—Many consumers are looking right past current shortages. What they see is making them cautious. They expect steel to be easier during the second half of the year.

A good many (but not all) steel people share this view. One producer is reported to have told a scrap supplier he expects no better than 85 pct operations during the second half.

Return to a competitive market in steel may touch off one of the bitterest scrambles for business in the history of the industry. Producers are looking at already high breakeven points, a decline in net income pct of sales, higher debt, higher fixed costs. If competition really gets tough they'll trim selling prices—both base prices and extras. First, though, they'll reduce the cost to the consumer by paying part of the freight charges.

Steelmaking operations this week are scheduled at 101 pct of rated capacity, unchanged from last week.



# ADDING NEW STRENGTH TO THE WEST

## Kaiser Steel's third blast furnace to increase Pacific Coast's production of new metal 50%

THE urgent need of more steel is as clear as the front page of your newspaper. And the production of new steel must start at the heart of a steel mill—its blast furnaces, which make pig iron for conversion into steel.

To help meet this need, Kaiser Steel—now operating the only two blast furnaces on the Pacific Coast—has started

construction of a third. Scheduled for completion in the spring of 1953, this blast furnace will increase Kaiser Steel's pig iron output by 50 per cent—438,000 additional tons a year.

Kaiser Steel's expansion program, entirely privately financed, also includes: . . . a ninth open hearth furnace to increase production of steel ingots

. . . ninety new by-product coke ovens to supply coke to the blast furnaces

. . . two new roll stands in the present hot strip mill, to enable it to roll sheet of lighter gauges and greater widths.

Naturally, this expansion means more prosperity for the West, through additional jobs and increased purchases of materials.

More important, it means that manufacturers here will be less dependent on steel produced in other areas . . . bringing the West another step forward in its advance to industrial self-sufficiency.

*It's good business to do business with*

**Kaiser Steel**

*built to serve the West*

KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, NEW YORK

## Market Briefs

**Power for Aluminum**—Reynolds Metals Co. plans for construction of an aluminum plant at Gum Springs, Ark., were given solid backing by a Federal Power Commission ruling this week. FPC approved a 30-year power guarantee agreed to earlier by Reynolds, Arkansas Power & Light Co., and Southwestern Power Administration. The parties signed their contract in January, but the Commission initially approved power rates for only 5 years. Reynolds was unwilling to proceed on this basis and negotiated a revised agreement, submitted to FPC on Apr. 25. (See p. 111.)

**Magnesium Too?**—Harvey Machine Co., Torrance, Calif., is thinking about entering the magnesium business. Latest Harvey proposal is construction of a magnesium plant near Redding, Calif. Size and capacity of the proposed plant have not yet been determined. Washington officials say size of the new venture will depend upon whether or not federal power will be available from the proposed Trinity River project at rates low enough to permit economic production of magnesium. Interior Dept. engineers plan a survey of the Redding area early in May and will subsequently report their views on the feasibility of the new Harvey proposal.

**No Change**—D. W. Frease, president of Empire Steel Corp., has emphatically denied that his company has decreased the price on long terne sheets as of Apr. 21 as reported in the Apr. 24 issue of THE IRON AGE. The price of Empire long terne sheets remains at a 6.05¢ per lb base, unchanged since Jan. 1951 when steel prices were filed with the Economic Stabilization Administration.

**More Imports**—British imports of steel are expected to be over 1 million tons higher in 1952 than last year. This will be largely due to the increased supplies which the United States is making available. Full benefit of the extra American steel will not be obtained until the latter part of the year. It is hoped to maintain exports at the 1951 level. If this is done, there should be an improvement in supplies to civilian industry, but with the increased demands for rearmament and export production a shortage of steel is likely to persist.

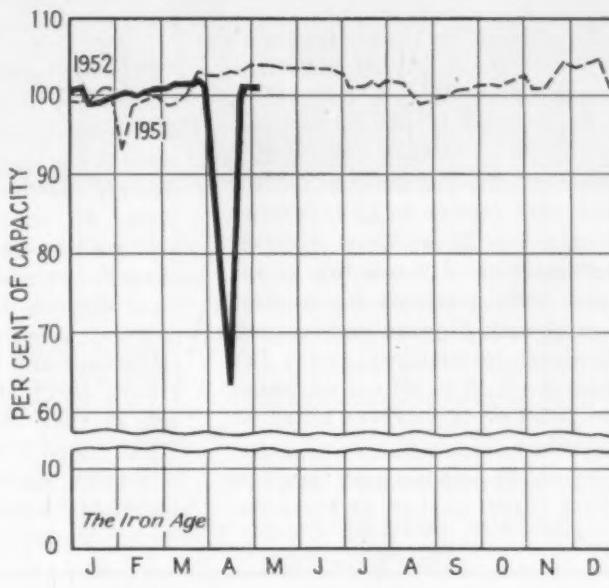
**Tight Spot**—Unlike most parts of the country, the Detroit steel market is hardening. Bars, billets and plates have always been tight there, and sheet is now hard to find too. One big buyer reported the market "tight on everything."

**Hardship Copper**—Supplemental copper allotments for Connecticut brass mills depends almost entirely on whether National Production Authority can fit the area into a special hardship classification. Positively no copper can be diverted from defense and military production, a delegation of labor and municipal officials were told by the agency last week. However, the agency is considering the area for the hardship category. It was told by the group that present allotments are inadequate to prevent large-scale layoffs and shortened workweeks.

**Shell Contract**—An additional \$9 million award for production of 155 mm Navy shells was announced last week by Rheem Mfg. Co., San Pablo, Calif. Two more Navy production lines will be started and total employment will hit 800 by the year's end. New contract is the third and largest held by the plant.

**Short Bars**—Some Midwest warehouses report cutbacks in bar allotments. Shortages may carry over into the third quarter, possibly longer. Cuts of 12 to 22 pct in plate and structurals have also been reported. Other items are generally easy, with straight chrome "almost a drug on the market."

### Steel Operations



### District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Apr. 20.....	102.0*	103.0	99.0	100.0	105.0	104.0	97.5*	113.0*	102.0	102.0	95.5	92.0	85.0	101.0
Apr. 27.....	104.0	103.0	100.0	100.0	100.0	104.0	98.0	109.0	102.0	104.0	95.5	92.0	85.0	101.0

\* Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.  
Revised.

## Nonferrous Markets

### Workers Strike at Chile Copper Mines

**Only Anaconda affected so far... Struck mines average about 22,000 tons a month... Union rejects mediation... Antimony price off 6¢, may foreshadow other cuts—By R. L. Hatschek.**

The fat's in the fire. At least as far as Anaconda Copper Mining Co. is concerned it is. The first major strike in the nonferrous industry started last Friday when workers at both Chuquicamata and Potrerillos, Chile, stopped work. These two mines supply the U. S. with about 22,000 tons of copper per month, making the stoppage a serious threat to the welfare of this country.

At press time, no one knew whether or not an early settlement could be hoped for in the face of labor demands which Anaconda termed exorbitant. Thus far, workers at copper properties of other American producers have not struck nor have they given any notice of so doing.

**Total Cost** — Union proposals call for about an 80 pct wage boost, 30 to 50 pct bonuses, 1 month holiday with travel expenses for worker and family, payment of a month's wages for each year service to an indemnity fund, a 6 to 25 pct boost in profit sharing with 5 pct going to the union kitty, pensions for workers over 50 with 25 years' service, new dismissal restrictions, and a life pension of 40 to 60 pct of wages for families of workers killed on the job.

Since the company employs about 15,000 workers at these two

mines, it has been estimated that the total added cost to Anaconda would be approximately \$15 million a year.

**Offered Mediation** — Right up to the last minute it appeared that the strike could be averted through mediation by a third party. That party was the President of Chile, Gonzalez Videla, who had offered his services in that capacity to prevent the stoppage. A vote of union members turned the tide against this arbitration.

There have been no new developments made public in the negotiations between Chile and the U. S. on the subject of the 6¢ per lb increase in copper prices the South American country is seeking.

**Waiting Game** — Wage Stabilization Board is still delinquent in the matter making wage recommendations to the aluminum industry. But nobody is pushing them. All concerned parties are still waiting on the edges of their seats for the final outcome in the steel dispute. Labor feels that it can get a better deal after that settlement and the aluminum producers don't think that arguing will do them (or steel) any good. What industry will really go after is a price increase to go with the inevitable wage boost.

**Antimony Tumbles** — National Lead Co. knocked 6¢ per lb off the price of antimony last week. This brings R.M.M. brand down to 44¢ per lb in bulk and 44½¢ per lb in cases f.o.b. Laredo, Tex. A company spokesman indicated reduced costs, particularly ore, as the reason for the price cut. This move followed reports of foreign offerings at between 40 and 45¢ per lb, duty paid, New York.

This could well be the shadow of things to come in some of the metals. Men in the lead and zinc industries are of the opinion that prices for both will be reduced some time this year.

**Cut Offer** — Following the almost surprising resistance to the earlier Canadian aluminum offer, Aluminum Co. of Canada last week made a revised offer when the first expired. The new offer covers 1,110,000 tons for the 1952 to 1958 period rather than the original 1,850,000 tons in the 1952 to 1959 period. And the requested guarantee has been cut from 900,000 tons to 450,000 tons.

But this new proposal is less objectionable to American producers in degree only. The original dispute was not over how much aluminum we should get from Canada but rather should we give Alcan a long-term agreement guaranteeing them a market despite possible conditions. U. S. producers wonder why the Canadians want any guarantee in view of the optimism they have expressed on future demand.

**Dissension in Ranks** — Latest reports concerning the nationalization of Bolivian tin mines under the new Nationalist Revolutionary government indicate a difference of opinion at high levels. The President and foreign minister want to go slowly on the proposition while the mines minister is in a big rush to get it done. Labor is also in the latter position. Meanwhile, Reconstruction Finance Corp. reports it was ready to make an offer that would have been acceptable, then came the revolution.

#### NONFERROUS METAL PRICES

	Apr. 23	Apr. 24	Apr. 25	Apr. 26	Apr. 28	Apr. 29
Copper, electro, Conn. ....	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered ...	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York ....	\$1.215	\$1.215	\$1.215	....	\$1.215	\$1.215
Zinc, East St. Louis .....	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis .....	18.80	18.80	18.80	18.80	18.80	18.80

Note: Quotations are going prices.

For  
conductivity  
plus strength  
specify  
**BERYLCO**  
**10 and 50**



Need a current-carrying material which is harder than copper, with greater resistance to wear? Investigate Berylco beryllium copper.

Berylco 10 has a conductivity of 45% and a tensile strength as high as 130,000 psi. It also has high elastic, endurance and impact strength... good corrosion resistance... ability to withstand high temperatures. It has been widely used in circuit breakers,

switch gear, and other current-carrying parts. It is available as strip, rod, bar, wire and forgings.

Berylco 50 has even greater conductivity than Berylco 10. It exceeds the requirements of RWMA Class 3 resistance welding alloys. Its hardness and conductivity make it ideal for spot, seam, flash and projection welding dies and electrodes. It is available as rod and bar stock.

Strength, conductivity, resistance to wear are only a few of the superior properties of Berylco beryllium copper. Find out what Berylco can do for you... take advantage of the technical knowledge of the world's largest producer.

*Tomorrow's products are planned today  
— with Berylco beryllium copper*

**SAMPLE MATERIAL AVAILABLE FOR  
TESTING PURPOSES**

**BERYLCO**

THE **BERYLLIUM** CORPORATION

DEPT. 2E, READING 6, PENNSYLVANIA

New York • Springfield, Mass. • Cleveland • Dayton • Detroit • Chicago • Minneapolis • St. Louis • Seattle • San Francisco • Los Angeles

Representatives in principal world-trade centers

## Nonferrous Prices

### MILL PRODUCTS

(Cents per lb, unless otherwise noted)

#### Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet:	0.188 in.	28, 3S, 30, 4S,
61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢;		
75S-O, 75S-OAL, 39.9¢; 0.051 in., 25, 3S, 31.2¢;		
4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL,		
34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 25, 3S,		
32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O,		
24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.		
Plate $\frac{1}{4}$ in. and heavier: 28, 3S-F, 28.3¢;		
4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O,		
24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.		

Extruded Solid Shapes: shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to \$1.16; 36 to 38, 47.2¢ to \$1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3,  $\frac{1}{4}$  to 11/32 in., 53.5¢ to 42¢;  $\frac{3}{8}$  to  $\frac{1}{2}$  in., 41.5¢ to 39¢; 19/32 in. to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 61S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in. in.:  $\frac{1}{4}$  to 2, 37¢ to 54¢; 2 to 4, 38.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., \$1.42; 96 in., \$1.522; 120 in., \$1.902; 144 in., \$2.284. Gage 0.24 x 28 in., 72 in., \$1.379; 96 in., \$1.839; 120 in., \$2.299; 144 in., \$2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ per lb.

#### Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O,  $\frac{1}{4}$  in., 63¢;  $\frac{1}{2}$  in., 65¢;  $\frac{3}{8}$  in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam. in.,  $\frac{1}{4}$  to 0.311 in., 74¢;  $\frac{3}{8}$  to  $\frac{1}{2}$  in., 67.5¢;  $\frac{1}{4}$  to 1.749 in., 58¢;  $\frac{3}{8}$  to 5 in., 48.5¢. Other alloys higher. Base up to  $\frac{1}{4}$  in. diam., 10,000 lb.;  $\frac{3}{8}$  to 2 in., 20,000 lb.; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 8.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 58.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to  $\frac{1}{2}$  lb, 10,000 lb;  $\frac{3}{8}$  to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam., in., 0.049 to 0.057;  $\frac{1}{4}$  in. to 5/16, \$1.40; 5/16 to  $\frac{3}{8}$ , \$1.26;  $\frac{3}{8}$  to  $\frac{1}{2}$ , 93¢; 1 to 2 in., 76¢; 0.165 to 0.219,  $\frac{3}{8}$  to  $\frac{1}{2}$ , 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in. in.: Up to  $\frac{1}{2}$  in., 10,000 lb;  $\frac{3}{8}$  in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

#### Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

#### Nickel and Monel

(Base prices, f.o.b. mill)

"A" Nickel Monel

Sheets, cold-rolled	77	60 $\frac{1}{2}$
Strip, cold-rolled	83	63 $\frac{1}{2}$
Rods and bars	73	58 $\frac{1}{2}$
Angles, hot-rolled	73	58 $\frac{1}{2}$
Plates	75	59 $\frac{1}{2}$
Seamless tubes	106	93 $\frac{1}{2}$
Shot and blocks	...	53 $\frac{1}{2}$

#### Copper, Brass, Bronze

(Freight prepay on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	...	41.28
Copper, h-r	37.53	...	...
Copper, drawn	38.78	...	...
Low brass	39.67	39.36	...
Yellow brass	38.28	37.97	...
Red brass	40.14	39.83	...
Naval brass	43.20	37.26	38.52
Leaded copper	41.58	...	...
Com'l bronze	41.13	40.82	...
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	...
Muntz metal	41.18	36.74	37.99
NI silver, 10 pct	49.82	52.04	...

### PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	44.00
Beryllium copper, 3.75-4.25% Be...	1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$69.50
Bismuth, ton lots	\$2.25
Cadmium, del'd	\$2.55
Cobalt, 97-99% (per lb)	\$2.40 to \$2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium dollars per troy oz.	\$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, sticks, 100 to 500 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	\$202 to \$205
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$90 to \$93
Silver, New York, cents per oz.	88.00
Tin, New York	\$1.215
Titanium, sponge	\$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	\$6.20

### REMELTED METALS

#### Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	27.25
No. 115	26.75
No. 120	26.25
No. 123	26.25
80-10-10 ingot	33.00
No. 305	30.50
No. 315	30.50
88-10-2 ingot	41.50
No. 210	40.00
No. 215	34.50
Yellow ingot	23.25
No. 405	30.50

#### Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	20.6
0.30 copper, max.	20.4
0.60 copper, max.	21.2
Piston alloys (No. 122 type)	19.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

#### Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 1/2%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

### ELECTROPLATING SUPPLIES

#### Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	Cast, oval, 15 in. or longer	37.84
	Electrodeposited	33%
	Flat rolled	38.84
	Forged ball anodes	43
Brass, 80-20	Cast, oval, 15 in. or longer	34 1/2
	Zinc, oval	26 1/2
	Ball anodes	25 1/2
Nickel, 99 pct plus	Cast	76.00
	Rolled, depolarized	77.00
Cadmium	per troy oz.	\$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97 1/2	

#### Chemicals

(Cents per lb, f.o.b. shipping points)	
Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, f.r.t. allowed	20 1/2
Nickel chloride, 375 lb drum	27 1/2
Silver cyanide, 100 oz lots, per oz.	67 1/2
Sodium cyanide, 96 pct domestic	200 lb drums
	19.25
Zinc cyanide, 100 lb drum	47.7

### SCRAP METALS

#### Brass Mill Scrap

(Cents per pound, add 1/4¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

Copper	Heavy	Turnings
Yellow brass	21 1/2	20%
Red brass	19 1/2	17 1/2
Comm. bronze	20 1/2	19 1/2
Mang. bronze	18 1/2	17 1/2
Brass rod ends	18 1/2	17 1/2

#### Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Auto radiators	17.25*
* Dry copper content.	14.75

#### Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Auto radiators	17.25*
* Mixed new clips	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Fots and pans	9.25

#### Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

No. 1 heavy copper and wire	18 1/2-19 1/2
No. 2 heavy copper and wire	17 1/2-18 1/2
Light copper	16-18 1/2
New type shell cuttings	16-18 1/2
Auto radiators (unsweated)	14 1/2-15 1/2
No. 1 composition	15-16 1/2
No. 1 composition turnings	15-16 1/2
Unlined red car boxes	16 1/2-17 1/2
Cocks and faucets	15 1/2-16 1/2
Mixed heavy yellow brass	12-13 1/2
Old rolled brass	15-16 1/2
Brass pipe	16-16 1/2</td

lb for  
; odd  
Turn-  
ings  
20%  
17%  
19%  
19%  
17%  
  
delivered  
19.25  
17.75  
16.50  
17.25\*  
14.75  
  
delivered  
19.25  
17.75  
16.50  
15.50  
15.50  
16.50  
14.75  
  
9.75  
11.00  
8.50  
8.25  
  
w York  
  
-19%  
-17%  
-16%  
-14%  
-18%  
-18  
-17%  
-16  
-12%  
-15%  
-10%  
-16%  
-16%  
-15%  
  
- 7%  
- 8  
- 10%  
- 8  
- 6  
- 8  
- 8  
  
-13%  
-10%  
- 7  
  
- 36  
- 36  
- 36  
- 36  
- 29  
- 21  
- 29  
- 14  
- 13  
  
- 16  
- 10%  
- 7%  
  
- 16  
- 15  
  
-110  
80  
60  
-16%  
- 23  
- 60  
- 22  
- 19  
- 18  
- 16%  
- 11  
- 9  
- 8  
  
1952



## No Scrap Left in Us?

There'd better be! And there is, *too much of it*, underestimated and overlooked. All it needs are wheels under it, speeded by the knowledge that there can be no more disastrous secret weapons turned against us than our own shut-down metal furnaces. Steel scrap and non-ferrous, both . . . get it *all* rolling back to the mills right now, so the mills can get it rolling back to you, in time. Pass the word to your factory manager to call in your local scrap dealer *today*. The Bristol Brass Corporation, since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

**"Bristol-Fashion" means Brass at its Best**

## Brisk Demand for Steelmaking Scrap

Demand is sound in all steel centers . . . Some mills are able to shorten freight hauls, thus cutting costs . . . Scrap trade can meet tighter springboards . . . Indicates freer supply.

Sales and inquiries for steelmaking grades of scrap continues from good to lusty in scrap centers. A good indicator of the freedom of supply in an area is what the mills are allowing on freight charges.

Pittsburgh producers have imposed shorter springboards. One mill entered the market for 25,000 tons, permitting an average freight springboard of \$4 per ton. Chicago reports freight charges shortened to from \$2.50 to \$5.

This setting of shorter springboards permits a mill to shave down its scrap costs without doing any monkeying with OPS ceiling limits. Brokers and dealers in most cases have reported that they are able to "live" with tighter springboards. Freer supply has permitted them to buy closer to home. In some cases the traditional buying areas are taking shape again.

Record steel production at Detroit was seen responsible for briskness of openhearth scrap demand. In Philadelphia and New York demand for steelmaking grades was considered healthy—although shipments may have slipped slightly.

In Cleveland and Birmingham steel mill demand for heavier grades was considered healthy although a tighter supply may have slowed down shipments somewhat. St. Louis reported demand strong with scrap movement good. Cincinnati reported a tighter market.

**Pittsburgh**—Some dealers are gambling on a firming of the cast market. Brokers report these dealers prefer to mix cast with other grades rather than sell at below-ceiling prices. Consumers are tightening up on springboards. A mill that came into the market for 25,000 tons specified a springboard average of \$4. Grading

continues strict. Inventories range from 30 days to a reported 60 days for a leading consumer here.

**Chicago**—Reports from western areas indicated a slight firming in cast prices, but the market remained extremely slack. Springboards here have been clipped to the nub, with \$5 and \$2.50 tops reported on some items. Rural collections have come up some with the spring weather, but industrial collection has been a little slow. Combination sales are still being reported. Generally, electric furnace inspections have been very tight and the market moving slowly. Mill inventories of scrap are well over 4 and 5 weeks.

**Philadelphia**—The scrap market here continues slow. Several days of rain have further bogged down yard and collector activity in the district but pressure is low. Cast and electric furnace grades remain easy and cast prices are off \$1 to \$2. Openhearth material is still in fairly high demand but mills are better off regarding inventories.

**New York**—Prime grades of cast iron are still moving out of this area in small sales. A rumor that a leading mill had dropped out of the scrap market was promptly squelched. Steelmaking grades of scrap are in good demand. All that's available is moving. There has been some slowdown in high cost, heavy unprepared scrap. Junkies are sticking close to home because of the soggy weather.

**Detroit**—Accelerated steel production in Detroit is creating a healthy demand for scrap. The ingot rate last week was 110 pct, highest in some time. The result is that any softness in the blast furnace grades has been eliminated and the two major mills in the area are taking all they can get. Electric furnaces are also buying strongly. The high production rate is preventing mills here from building up their inventories to any great extent. Inventories are estimated between 2 to 4 weeks.

**Cleveland**—Flow of scrap in this area has not yet returned to the pre-strike level. Movement was not too heavy or free during the past week and mills are starting to show more interest in securing material. Mills are able to maintain inventories at present levels, which in the case of one large producer averages 30 days' supply. Some producers who had backed away from dealer scrap allocations at the end of March are asking that they be resumed.

**Birmingham**—The flow of heavy melting scrap into the district showed a further slowing-up this week as more farmers returned to agricultural duties. However, sufficient scrap is still being delivered to the mills, most of which have from 30 to 40 days' supply, according to dealers' estimates. So far, no southern mills have indicated an intention of following a western concern that is reported to have cut its offer below ceiling prices. The cast market is still dull, but some cast is going north.

**St. Louis**—Steel mill stockpiles are growing. One mill has 30 days; another, 45 days. Some steel casting plants are short of specialties. Few dealer allocations are being issued, but railroad allocations continue, most for out-of-the-area mills. Gray iron foundries still want rail end allocations but aren't buying cast. Gray iron scrap sells from \$5 to \$7 a ton below ceiling shipping point prices and is bought on a delivered basis in St. Louis.

**Cincinnati**—Market here is generally tighter on openhearth scrap than it has been for several weeks. Demand has been quite active with no oversupply. One mill in the area took a one-shot allocation of 7000 tons of Texas dealer scrap to make up for a falling down in commitments on their order books. For the most part they are depending on their ability to get free scrap. Another openhearth consumer in the area was reported to be in difficulty last week due to a falling off of shipments. On the whole, inventories in this area are below other steel centers.

**Buffalo**—All branches of the scrap market had a softer tone. New business in cupola cast sent prices even further below ceilings. Steelmaking grades hold. Inventories are building up in this area.

# SCRAP

for your every requirement

## LURIA BROTHERS AND COMPANY, INC.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

PLANTS MAIN OFFICE

LEBANON, PENNA.  
READING, PENNA.  
DETROIT (E CORSE),  
MICHIGAN  
MODENA, PENNA.  
PITTSBURGH, PENNA.  
ERIE, PENNA.



LINCOLN-LIBERTY BLDG.  
Philadelphia 7, Penna.  
BIRMINGHAM, ALA.  
Empire Building  
CHICAGO, ILLINOIS  
100 W. Monroe St.

BOSTON, MASS.  
Statler Building  
CLEVELAND, OHIO  
1022 Midland Bldg.

BUFFALO, N. Y.  
Genesee Building  
DETROIT, MICHIGAN  
2011 Book Building

OFFICES

HOUSTON, TEXAS  
1114 Texas Av. Bldg.  
LEBANON, PENNA.  
Luria Building  
NEW YORK, N. Y.  
100 Park Avenue

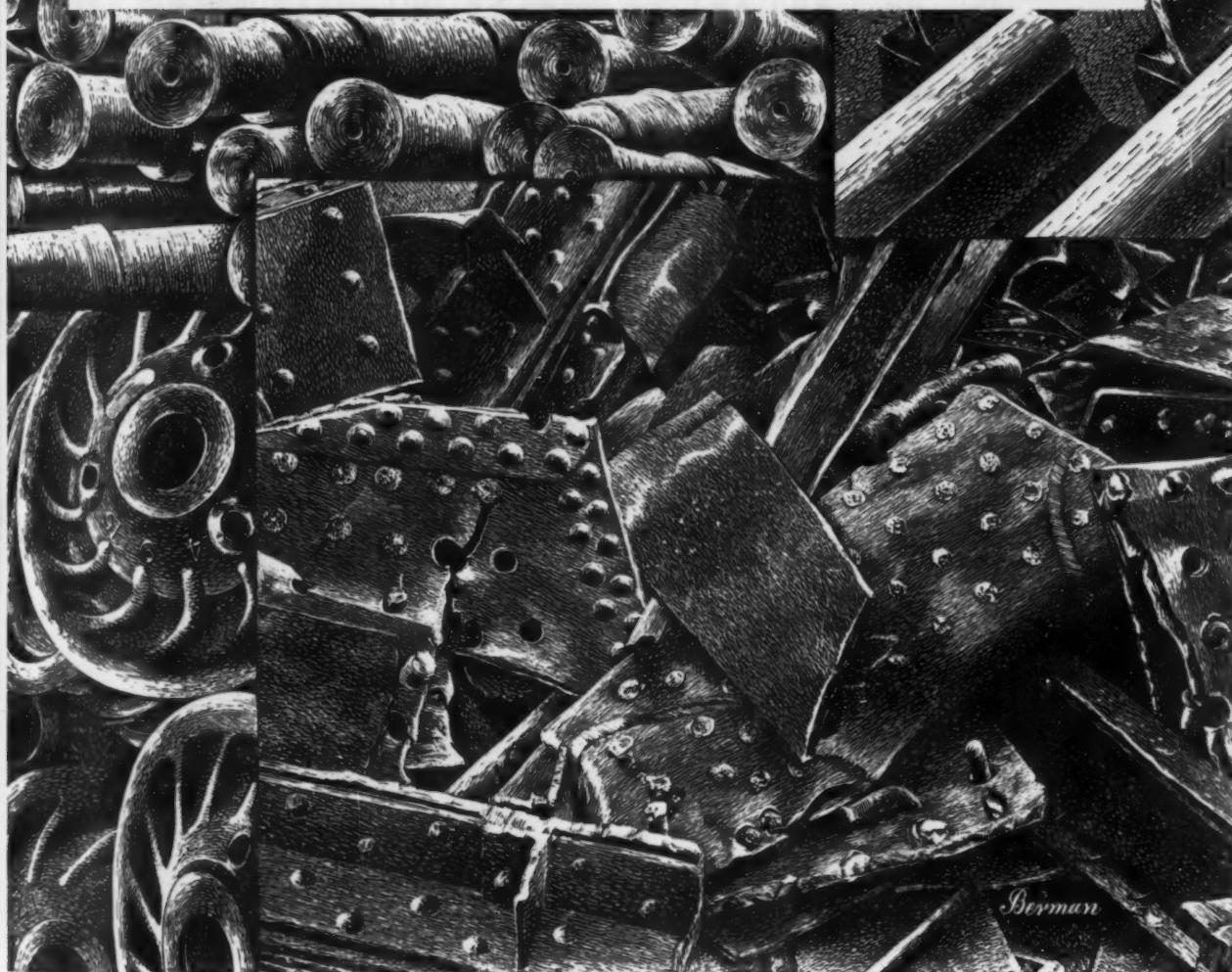
PITTSBURGH, PA.  
Oliver Building  
PUEBLA, COLORADO  
334 Colorado Bldg.  
READING, PENNA.  
Luria Building

SAN FRANCISCO, CALIFORNIA  
Pacific Gas & Elec. Co., Bldg.

ST. LOUIS, MISSOURI  
3055 Railway Exchange Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman



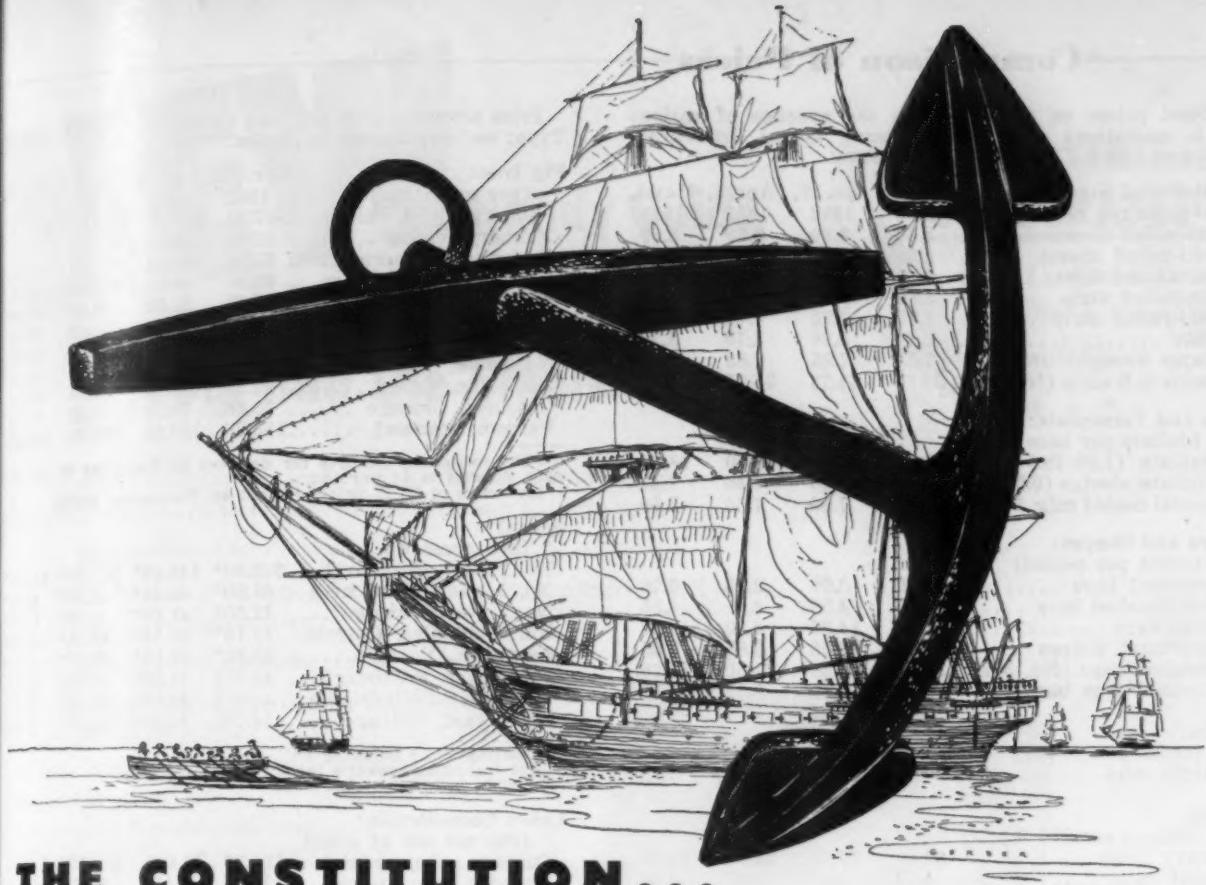
## Scrap Prices

### Iron and Steel

### SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

GRADES	OPS No.	Switching Charge (Dollars per gross ton) →												Basing Points →																																																																																											
		Pittsburgh	Johnstown	Braddock	Butler	Midland	Horness	Sharon	Canton	Steubenville	Youngstown	Warren	Western	Cleveland	Bethel	Cincinnati	Clayton	Cincinnati	Gatesville	Caneshocken	Harrisburg	Phoenixville	Spartown P.	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	St. Paul	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Long Beach, Calif.	Pittsburgh, Pa.	Portland, Ore.	San Francisco	Seattle																																																																
No. 1 bundles	1	\$44.00	\$44.00	\$43.00	\$42.50	\$42.00	\$41.00	\$41.15	\$40.00	\$39.50	\$39.00	\$38.50	\$38.00	\$37.00	\$36.50	\$36.00	\$35.50	\$35.00	\$34.50	\$34.00	\$33.50	\$33.00	\$32.50	\$32.00	\$31.50	\$31.00	\$30.50	\$30.00	\$29.50	\$29.00	\$28.50	\$28.00	\$27.50	\$27.00	\$26.50	\$26.00	\$25.50	\$25.00																																																																			
No. 1 busheling	2	44.00	44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.50	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00																																																																			
No. 1 heavy melting	3	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.50	37.00	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00																																																																					
No. 2 heavy melting	4	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.50	37.00	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00																																																																					
No. 2 bundles	5	43.00	43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.50	37.00	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00																																																																					
Machin shop turnings	6	34.00	34.00	33.00	32.50	32.00	31.00	31.15	30.00	29.50	29.00	28.50	28.00	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00																																																																			
Mixed borings and turnings	7	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00																																																									
Shoveling turnings	8	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00																																																									
Cast iron borings	10	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00																																																									
No. 1 chemical borings	28	41.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00	25.00	24.00	23.00	22.00	21.00	20.00	19.00	18.00	17.00	16.00	15.00	14.00	13.00	12.00	11.00	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00																																																													
Forge crops	11	51.50	51.50	50.50	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00	14.50	14.00	13.50	13.00	12.50	12.00	11.50	11.00	10.50	10.00	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50	0.00
Bar crops and plate	12	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00	14.50	14.00	13.50	13.00	12.50	12.00	11.50	11.00	10.50	10.00	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50	0.00					
Punchings and plate	14	46.50	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00	14.50	14.00	13.50	13.00	12.50	12.00	11.50	11.00	10.50	10.00	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50	0.00									
Electric furnace bundles	15	46.00	46.00	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00	14.50	14.00	13.50	13.00	12.50	12.00	11.50	11.00	10.50	10.00	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50	0.00											
Cut struct., plate, 3 ft and less	15	47.00	47.00	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50	20.00	19.50	19.00	18.50	18.00	17.50	17.00	16.50	16.00	15.50	15.00	14.50	14.00	13.50	13.00	12.50	12.00	11.50	11.00	10.50	10.00	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50	0.00									
Cut struct., plate, 2 ft and less	17	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00	20.50</																																														



## THE CONSTITUTION...

*evaded the British with a kedge anchor*

Becalmed off the New Jersey coast in 1812, the historic "Constitution" escaped a powerful British squadron by the novel use of its kedge anchor. The anchors of this famous U. S. Frigate were made by Abel Noble in the year 1750.

Re-armament of our Navy, Army, Air Force now requires millions of tons of steel. Additional millions are required for construction, and civilian production. A continuing supply of scrap is vital.

*for the purchase or sale of iron or steel scrap...*

*phone or write "Your Chicago Broker"*



231 S. La Salle St., Chicago

Telephone ANDover 3-3900

## Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel	Apr. 29,	Apr. 22,	Apr. 1,	May 1,
(cents per pound)	1952	1952	1952	1951
Hot-rolled sheets .....	3.60	3.60	3.60	3.60
Cold-rolled sheets .....	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga) .....	4.80	4.80	4.80	4.80
Hot-rolled strip .....	3.50	3.50	3.50	3.50
Cold-rolled strip .....	4.75	4.75	4.75	4.75
Plate .....	3.70	3.70	3.70	3.70
Plates wrought iron .....	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302) .....	36.75	36.75	36.75	36.50

Tin and Terneplate:				
(dollars per base box)				
Tinplate (1.50 lb.) cokes .....	\$8.70	\$8.70	\$8.70	\$8.70
Tinplate, electro (0.50 lb.) .....	7.40	7.40	7.40	7.40
Special coated mfg. terne .....	7.50	7.50	7.50	7.50

Bars and Shapes:				
(cents per pound)				
Merchant bars .....	3.70	3.70	3.70	3.70
Cold finished bars .....	4.55	4.55	4.55	4.55
Alloy bars .....	4.30	4.30	4.30	4.30
Structural shapes .....	3.65	3.65	3.65	3.65
Stainless bars (No. 302) .....	31.50	31.50	31.50	31.25
Wrought iron bars .....	9.50	9.50	9.50	9.50

Wire				
(cents per pound)				
Bright wire .....	4.85	4.85	4.85	4.85

Rails				
(dollars per 100 lb)				
Heavy rails .....	\$3.60	\$3.60	\$3.60	\$3.60
Light rails .....	4.00	4.00	4.00	4.00

Semifinished Steel:				
(dollars per net ton)				
Rerolling billets .....	\$56.00	\$56.00	\$56.00	\$56.00
Slabs, rerolling .....	56.00	56.00	56.00	56.00
Forging billets .....	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs .....	70.00	70.00	10.00	70.00

Wire Rod and Skelp:				
(cents per pound)				
Wire rods .....	4.10	4.10	4.10	4.10
Skelp .....	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in Italics.

Pig Iron:	Apr. 29,	Apr. 22,	Apr. 1,	May 1,
(per gross ton)	1952	1952	1952	1951
Foundry, del'd Phila. ....	\$57.97	\$57.97	\$57.97	\$57.77
Foundry, Valley .....	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti .....	55.58	55.58	55.58	55.58
Foundry, Birmingham ..	48.88	48.88	48.88	48.88
Foundry, Chicago† .....	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia. ....	57.09	57.09	57.09	56.92
Basic, Valley furnace .....	52.00	52.00	52.00	52.00
Malleable, Chicago† .....	52.50	52.50	52.50	52.50
Malleable, Valley .....	52.50	52.50	52.50	52.50
Charcoal, Chicago .....	70.56	70.56	70.56	70.56
Ferro-manganese† .....	186.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is \$1 per ton.

†Average of U. S. prices quoted on Ferroalloy pages.

Scrap:	(per gross ton)			
No. 1 steel, Pittsburgh. ....	\$43.00*	\$43.00*	\$43.00*	\$44.00*
No. 1 steel, Phila. area. ....	41.50*	41.50*	41.50*	42.50*
No. 1 steel, Chicago .....	41.50*	41.50*	41.50*	42.50*
No. 1 bundles, Detroit .....	41.15*	41.15*	41.15*	41.15*
Low phosph., Young'n. ....	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh. ....	45.50†	45.50†	49.75†	49.00†
No. 1 cast, Philadelphia. ....	45.50†	48.00†	48.50†	49.00†
No. 1 cast, Chicago .....	44.00†	44.00†	44.50†	49.00†

\*Basing Pt. †Shipping Pt.  
Not including broker's fee after Feb. 7, 1951.

†Del'd., includes broker's fee.

Coke: Connellsville:	(per net ton at oven)			
Furnace coke, prompt .....	\$14.75	\$14.75	\$14.75	\$14.75
Foundry coke, prompt .....	17.75	17.75	17.75	17.75

Nonferrous Metals:	(cents per pound to large buyers)			
Copper, electro, Conn. ....	24.50	24.50	24.50	24.50
Copper, Lake, Conn. ....	24.625	24.625	24.625	24.625
Tin, Straits, New York .....	\$1.215	\$1.215	\$1.215	\$1.42
Zinc, East St. Louis .....	19.50	19.50	19.50	17.50
Lead, St. Louis .....	18.80	18.80	18.80	18.80
Aluminum, virgin .....	19.00	19.00	19.00	19.00
Nickel, electrolytic .....	59.58	59.58	59.58	55.55
Magnesium, ingot .....	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex. ....	44.00	50.00	50.00	42.00

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1940 to 1946 inclusive and 1948 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron	Scrap Steel
.... \$52.72 per gross ton....	.... \$42.00 per gross ton....
.... 52.72 per gross ton....	.... 42.00 per gross ton....
.... 52.72 per gross ton....	.... 42.00 per gross ton....
.... 52.69 per gross ton....	.... 43.00 per gross ton....

High	Low	High	Low	High	Low
1952.... 4.131¢ Jan. 1	4.131¢ Jan. 1	\$52.72 Jan. 1	\$52.72 Jan. 1	\$42.00 Jan. 1	\$42.00 Jan. 1
1951.... 4.131¢ Jan. 2	4.131¢ Jan. 2	52.72 Oct. 9	52.69 Jan. 2	47.75 Jan. 30	42.00 Oct. 23
1950.... 4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949.... 3.837¢ Dec. 27	3.705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 23
1948.... 3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947.... 3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946.... 2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945.... 2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944.... 2.396¢	2.396¢	\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 24
1943.... 2.396¢	2.396¢	23.61	23.61	\$19.17	\$19.17
1942.... 2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941.... 2.396¢	2.396¢	\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	18.92 May 23
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.88 Dec. 30	16.04 Apr. 9
1939.... 2.35367¢ Jan. 3	2.27207¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.					
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.					
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.					

# NEW...Handy Guide to Spark Testing Tool and Die Steels!

Here's all the information you need on Spark Testing to quickly identify standard tool and die steels. This new, 20-page Carpenter Guide to Spark Testing will help you . . .

1. Separate mixed tool steel stocks.
2. Double-check the type of steel before starting to make a tool or die, and before heat treating.
3. Segregate tool steel scrap for salvage.

To help conserve steel and avoid heat treating errors that are costly in time, labor and money, put Carpenter's new Spark Testing Guide to work in your plant.

This guide is offered free to tool steel users.

For your copy, clip and mail coupon, now.

THE CARPENTER STEEL COMPANY,  
121 W. Bern St., Reading, Pa.

Individual spark diagrams on Carpenter Matched Tool and Die Steels plus effect of various elements on spark characteristics, are clearly described in this new guide. Instructions are also given for Spark Testing procedure; effects of wheel speeds and gain size, dressing the wheel and pressure required.



**Carpenter**   
**MATCHED TOOL & DIE STEELS**

Export Department: Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout  
the U.S.A. and Canada



**CLIP AND MAIL... TAKE ADVANTAGE OF THIS OFFER, NOW** 

THE CARPENTER STEEL COMPANY  
121 W. BERN ST., READING, PA.

Please send me a copy of your new, handy guide to Spark Testing Tool and Die Steels.

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....  
(Please Print)

To help us get this guide to you personally, be sure to include your title and Company name.

IRON AGE  STEEL PRICES		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL- ING	SHAPES STRUCTURAL		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.						\$70.00 B3			3.70 B3	5.50 B3			
	Buffalo, N. Y.			\$56.00 B3	\$66.00 B3, R3	\$70.00 B3, R3		4.45 B3	3.70 B3	5.50 B3	3.50 B3, R3	4.65 B3	4.95 B3	6.00 B3
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				\$73.00 A2	\$77.00 A2					3.90 A2		5.55 A2	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			\$56.00 B3	\$66.00 B3	\$70.00 B3			3.70 B3	5.50 B3	3.50 B3			
	Newark, N. J.													
	New Haven, Conn.												5.15 A5 5.85 D1	
	Phoenixville, Pa.								5.90 P2					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 B3	4.65 B3	4.95 A1, B3	6.10 B1
	Worcester, Mass.													
MIDDLE WEST	Trenton, N. J.											6.00 R6		
	Alton, Ill.											3.95 L1		
	Ashland, Ky.											3.50 A7		
	Canton-Massillon				\$66.00 R3	\$70.00 R3 \$66.00 T5								
	Chicago, Ill.			\$56.00 U1	\$66.00 U1, R3,W8	\$70.00 U1, R3,W8		4.45 U1	3.65 U1, W8	5.50 U1	3.50 A1, W8	4.90 A1,B3		
	Cleveland, Ohio				\$66.00 R3								4.65 A5, J3	6.55 A5 6.70 J3
	Detroit, Mich.		\$54.00 R5		\$69.00 R5	\$73.00 R5						4.40 M2 3.80 G4	4.85 G4 5.45 M2 5.60 R5,D1	5.95 G4
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			\$56.00 U1	\$66.00 U1	\$70.00 U1, Y1		4.45 J3	3.65 U1, J3	5.50 U1, J3 6.00 Y1	3.50 U1, Y1,I3	4.90 I3	5.30 U1, I3 5.80 Y1	11A U1 Y1,I3
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											3.50 A7	4.65 A7	
	Niles, Ohio Sharon, Pa.											4.00 S1	5.35 S1	5.40 S1 6.55 S1
	Pittsburgh, Pa.	\$52.00 U1	\$54.00 U1, C11	\$56.00 U1	\$66.00 U1	\$70.00 U1, C11	3.35 U1, 3.45 J3	4.45 U1	3.65 U1, J3	5.50 U1, J3	4.00 S9,S7 3.75 A3 3.50 J3,A7	4.65 J3,A7 5.00 A3 5.35 B4,S7		
WEST	Portsmouth, Ohio													
	Weirton, Wheeling, Fellowsbee, W. Va.										3.90 W3		3.60 W3	4.65 W3 5.35 F3
	Youngstown, Ohio						\$70.00 Y1, C10	3.35 U1, R3			6.00 Y1	3.50 U1, R3,Y1	4.65 R2,Y1 5.25 C5,T4 5.35 B4	5.38 U1, R3 7.85 Y1
	Fontana, Cal.	\$79.00 K1	\$80.00 K1	\$75.00 K1	\$85.00 K1	\$89.00 K1				4.25 K1	6.10 K1	4.75 K1	6.30 K1	6.20 K1 6.95 K1
	Geneva, Utah						\$66.00 G1			3.65 G1	5.50 G1			
	Kansas City, Mo.									4.25 S2		4.10 S2		
	Los Angeles, Cal.						\$85.00 B2	\$90.00 B2		4.25 B2, C7	6.05 B2	4.25 B2,C7	6.40 C1	6.05 B2
	Minnequa, Colo.									4.10 C6		4.55 C6		
	San Francisco, Cal.						\$85.00 B2			4.20 B2	6.00 B2	4.25 C7,B2		6.05 B2
	Seattle, Wash.						\$85.00 B2			4.30 B2	6.10 B2	4.50 B2		6.30 B2
SOUTH	Atlanta, Ga.											4.05 A8		
	Birmingham, Ala.						\$56.00 T2	\$66.00 T2		3.60 R3 3.65 T2	5.50 T2	3.50 R3,T2		5.30 T2
	Houston, Texas						\$62.00 S2			4.05 S2		3.90 S2		

Prices identify producers listed in key at end of table. Base price, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
STEEL PRICES		BARS						PLATES			WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg. Bright
EAST	Bethlehem, Pa.				4.30 B3	5.40 B3	5.55 B3					
	Buffalo, N. Y.	3.70 B3, R3	3.70 B3, R3	4.60 B5	4.30 B3, R3	5.40 B3	5.55 B3	3.70 B3				4.85 W6
	Claymont, Del.							4.15 C4		4.85 C4		
	Coatesville, Pa.							4.15 L4		5.25 L4		
	Conshohocken, Pa.							4.15 A2		4.75 A2	5.05 A2	5.90 A2
	Harrisburg, Pa.							6.30 C3		6.30 C3		
	Hartford, Conn.			5.10 R3		5.85 R3						
	Johnstown, Pa.	3.70 B3	3.70 B3		4.30 B3		5.55 B3	3.70 B3		4.75 B3	5.65 B3	4.85 B3
	Newark, N. J.			5.00 W10		5.75 W10						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 W10								
	Sparrows Point, Md.		3.70 B3					3.70 B3		4.75 B3	5.65 B3	4.85 B3
	Worcester, Mass.			5.10 B5		5.75 A5						5.15 A5, W6
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.15 L1										5.85 L1
	Ashland, Ky.							3.70 A7				
	Canton-Massillon	3.70 R3		4.55 R3, R2	3.95 T5 4.30 R3	4.90 T5 5.40 R3, R2						
	Chicago, Ill.	3.70 U1, R3, W8	3.70 R3	4.55 A5, B5, W8, W1	4.30 U1, R3, W8	5.40 R3, W8, W10, B5, L2 5.45 A5		3.70 U1, W8	4.75 U1	4.75 U1	5.65 U1	5.10 W7 4.85 R3, A5, K2, N4
	Cleveland, Ohio	3.70 R3	3.70 R3	4.55 A5, C13		5.45 A5	5.55 R3, J3	3.70 R3, J3	4.75 J3		5.65 R3, J3	4.85 A5, C13
	Detroit, Mich.	3.85 R5		4.70 P8 4.80 P3	4.45 R5 4.65 G4	5.55 P8 5.60 P3						
	Duluth, Minn.											4.85 A5
	Gary, Ind. Harbor, Indiana	3.70 U1, R3, Y1, I3	3.70 U1, I3, Y1	4.55 R3, M5, L2	4.30 U1, I3, Y1	5.40 R3, M5, L2	5.55 U1, I3 6.05 Y1	3.70 U1, I3, Y1	4.75 I3	4.75 U1	5.65 U1, I3 6.15 Y1	5.10 M4
	Granite City, Ill.							4.40 G3				
	Kokomo, Ind.											4.95 C9
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 S1		5.20 S1	5.70 S1	
	Pittsburgh, Pa.	3.70 U1, J3	3.70 U1, J3	4.55 R3, A5, J3, S8, W10, C8	4.30 U1, C11	5.40 C11, S8, W10, C8, A5	5.55 U1, J3	3.70 U1, J3	4.75 U1	4.75 U1	5.65 U1, J3 5.10 P6	
	Portsmouth, Ohio											5.25 P7
WEST	Weirton, Wheeling, Follansbee, W. Va.		3.85 W3					4.00 W3, W5				
	Youngstown, Ohio	3.70 U1, R3, Y1	3.70 U1, R3, Y1	4.55 Y1, F2	4.30 U1, Y1, C10	5.40 Y1, C10, F2	5.55 U1 6.05 Y1	3.70 U1, R3, Y1			5.65 R3 6.15 Y1	4.85 Y1
	Fontana, Cal.	4.40 K1	4.40 K1			5.35 K1		6.60 K1	4.30 K1		5.70 K1	6.25 K1
	Geneva, Utah								3.70 G1			5.65 G1
	Kansas City, Mo.	4.30 S2	4.30 S2			4.90 S2						5.45 S2
	Los Angeles, Cal.	4.40 C7, B2	4.40 C7, B2	6.00 B2, R3	5.35 B2			6.25 B2				5.80 C7
	Minnequa, Colo.	4.15 C6	4.50 C6						4.50 C6			5.10 C6
	San Francisco, Cal.	4.45 B2 4.40 C7	4.45 B2, C7					6.30 B2				5.80 C7
SOUTH	Seattle, Wash.	4.45 B2	4.45 B2					6.30 B2	4.60 B2			6.55 B2
	Atlanta, Ga.	4.25 A8	4.25 A8									5.10 A8
	Birmingham, Ala.	3.70 R3, T2	3.70 R3, T2					5.55 T2	3.70 R3, T2		5.65 T2	4.85 R3, T2
	Houston, Tex.	4.10 S2	4.10 S2			4.70 S2			4.10 S2			5.25 S2

## Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago  
 A2 Also Wood Steel Co., Conshohocken, Pa.  
 A3 Allegheny Ludlum Steel Corp., Pittsburgh  
 A4 American Giacometti Co., Carnegie, Pa.  
 A5 American Steel & Wire Div., Cleveland  
 A6 Angel Nail & Chaplet Co., Cleveland  
 A7 Arco Steel Corp., Middletown, O.  
 A8 Atlantic Steel Co., Atlanta, Ga.  
 B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.  
 B2 Babcock Pacific Coast Steel Corp., San Francisco  
 B3 Bethlehem Steel Co., Bethlehem, Pa.  
 B4 Blair Strip Steel Co., New Castle, Pa.  
 B5 Bliss & Laughlin Inc., Harvey, Ill.  
 C1 California Cold Rolled Steel Corp., Los Angeles  
 C2 Carpenter Steel Co., Reading, Pa.  
 C3 Central Iron & Steel Co., Harrisburg, Pa.  
 C4 Claymont Steel Corp., Claymont, Del.  
 C5 Cold Metal Products Co., Youngstown  
 C6 Colorado Fuel & Iron Corp., Denver  
 C7 Columbia-Genesee Steel Co., San Francisco  
 C8 Columbia Steel & Shaping Co., Pittsburgh  
 C9 Continental Steel Corp., Kokomo, Ind.  
 C10 Copperweld Steel Co., Glassport, Pa.  
 C11 Crucible Steel Co. of America, New York  
 C12 Cumberland Steel Co., Cumberland, Md.  
 C13 Cuyahoga Steel & Wire Co., Cleveland  
 D1 Detroit Steel Corp., Detroit  
 D2 Detroit Tube & Steel Div., Detroit  
 D3 Driver Harris Co., Harrison, N. J.  
 E1 Eastern Stainless Steel Corp., Baltimore  
 E2 Empire Steel Co., Mansfield, O.  
 F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.  
 F2 Friesenmeyer Steel Corp., Youngstown  
 F3 Follansbee Steel Corp., Follansbee, W. Va.  
 G1 Geneva Steel Co., Salt Lake City  
 G2 Globe Iron Co., Jackson, O.  
 G3 Granite City Steel Co., Granite City, Ill.  
 G4 Great Lakes Steel Corp., Detroit  
 H1 Hanna Furnace Corp., Detroit  
 I1 Ingraham Steel Div., Chicago  
 I2 Inland Steel Co., Chicago  
 I3 Interlake Iron Corp., Cleveland  
 J1 Jackson Iron & Steel Co., Jackson, O.  
 J2 Jemco Steel Corp., Washington, Pa.  
 J3 Jones & Laughlin Steel Corp., Pittsburgh  
 J4 Justyn Mfg. Supply Co., Chicago  
 K1 Kaiser Corp., Oakland, Cal.  
 K2 Keystone Steel & Wire Co., Peoria  
 K3 Koppers Co., Granite City, Ill.  
 L1 Lacold Steel Co., St. Louis  
 L2 La Salle Steel Co., Chicago  
 L3 Lone Star Steel Co., Dallas  
 L4 Lukens Steel Co., Coatesville, Pa.  
 M1 Mahoning Valley Steel Co., Niles, O.  
 M2 McLouth Steel Corp., Detroit  
 M3 Marco Tube & Mfg. Co., Sharon, Pa.  
 M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.  
 M5 Monarch Steel Co., Inc., Hammond, Ind.  
 M6 Mystic Iron Works, Everett, Mass.  
 N1 National Supply Co., Pittsburgh  
 N2 National Tube Co., Pittsburgh  
 N3 Niles Rolling Mills Co., Niles, O.  
 N4 Northwestern Steel & Wire Co., Sterling, Ill.  
 O1 Oliver Iron & Steel Co., Pittsburgh  
 P1 Page Steel & Wire Div., Monessen, Pa.  
 P2 Phoenix Iron & Steel Co., Phenixville, Pa.  
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.  
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh  
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh  
 P6 Pittsburgh Steel Co., Pittsburgh  
 P7 Portsmouth Div., Detroit Steel Corp., Detroit  
 P8 Plymouth Steel Co., Detroit  
 R1 Reeves Steel & Mfg. Co., Dover, O.  
 R2 Reliance Div., Eaton Mfg. Co., Massillon, O.  
 R3 Republic Steel Corp., Cleveland  
 R4 Rosling Sons Co. (John A.), Trenton, N. J.  
 R5 Rotary Electric Steel Co., Detroit  
 S1 Sharpen Steel Corp., Sharon, Pa.  
 S2 Sheffield Steel Corp., Kansas City  
 S3 Slemangco Furnace Co., Pittsburgh  
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.  
 S5 Sloss Steel & Iron Co., Birmingham  
 S6 Standard Forging Corp., Chicago  
 S7 Stanley Works, New Britain, Conn.  
 S8 Superior Drawn Steel Co., Monaca, Pa.  
 S9 Superior Steel Corp., Carnegie, Pa.  
 S10 Sweet's Steel Co., Williamsport, Pa.  
 T1 Tonawanda Iron Div., N. Tonawanda, N. Y.  
 T2 Tennessee Coal, Iron & R. R. Co., Birmingham  
 T3 Tennessee Products & Chem. Corp., Nashville  
 T4 Thomas Steel Co., Warren, O.  
 T5 Timken Steel & Tube Div., Canton, O.  
 T6 Tremont Nail Co., Wareham, Mass.  
 U1 United States Steel Co., Pittsburgh  
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.  
 W1 Wallingford Steel Co., Wallingford, Conn.  
 W2 Washington Steel Corp., Washington, Pa.  
 W3 Weirton Steel Co., Weirton, W. Va.  
 W4 Wheatland Tube Co., Wheatland, Pa.  
 W5 Wheling Steel Corp., Wheling, W. Va.  
 W6 Wickwire Spencer Steel Co., Buffalo  
 W7 Wilson Steel & Wire Co., Chicago  
 W8 Wisconsin Steel Co., S. Chicago, Ill.  
 W9 Woodward Iron Co., Woodward, Ala.  
 W10 Wyckoff Steel Co., Pittsburgh  
 Y1 Youngstown Sheet & Tube Co., Youngstown

## Steel Prices

Base price, f.o.b., dollars per 100 lb. \*Metropolitan area delivery add 20¢ except B'ham, San Fran., Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Phila., add 25¢; N. Y., add 30¢.

WARE-HOUSES	Sheets						Plates	Shapes	Bars	Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gauge)	Galvanized (10 gauge)	Hot-Rolled	Cold-Rolled	Standard Structural	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 415	Hot-Rolled A 419	Cold-Drawn A 415	Cold-Drawn A 419
Cities													
Baltimore	5.54	6.88	8.28	6.03	.....	6.13	6.13	6.01	6.83	.....	.....	.....	.....
Birmingham*	5.59	6.37	7.28	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	6.20	6.98	8.35	6.15	7.74	6.38	6.20	6.05	6.78	10.25	10.55	11.95	12.15
Buffalo	5.50	6.28	8.28	5.86	8.70	5.89	5.80	5.52	6.18	10.15	10.45	11.80	12.10
Chicago	5.54	6.32	8.23	6.10	.....	5.98	5.82	5.55	6.45	.....	10.48	12.13	12.13
Cincinnati*	5.84	6.38	8.29	5.77	.....	6.14	6.09	5.75	6.64	.....	10.49	.....	12.14
Cleveland	5.54	6.32	7.98	5.65	.....	5.82	5.98	5.95	6.40	.....	10.21	.....	11.86
Detroit	5.76	6.50	8.47	6.15	.....	6.14	6.09	5.74	6.64	.....	10.45	.....	12.10
Houston	6.35	7.37	8.57	6.15	.....	6.38	6.32	6.38	8.38	10.95	11.12	11.40	12.62
Indianapolis, Ind.	5.94	6.72	8.25	5.89	.....	6.10	6.05	5.87	6.50	.....	10.50	.....	.....
Kansas City	6.22	7.64	8.66	6.10	7.81	6.38	6.43	6.20	7.01	10.00	10.10	11.50	11.80
Los Angeles	6.30	8.10	9.38	6.40	10.45	6.30	6.30	6.25	8.15	11.30	11.30	13.05	13.50
Memphis*	6.25	7.03	7.51	6.20	.....	6.36	6.36	6.33	7.11	.....	.....	.....	.....
Milwaukee	5.70	.....	8.01	5.65	.....	5.86	5.81	5.63	6.61	.....	10.26	.....	.....
New Orleans*	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.82	.....	.....	.....	.....
New York*	6.09	6.87	8.25	7.19	7.67	6.44	6.07	6.19	6.99	10.45	10.48	12.10	11.40
Norfolk	6.68	.....	6.52	6.91	.....	6.88	6.40	6.42	7.29	10.75	10.75	12.40	12.40
Philadelphia*	5.79	6.72	8.10	6.08	7.15	6.05	5.84	6.02	6.91	9.52	10.22	11.82	11.88
Pittsburgh	5.54	.....	8.25	5.84	.....	6.19	6.09	6.27	7.16	10.17	10.47	12.12	12.12
Portland	9.00	9.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salt Lake City	7.95	.....	9.30	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco*	6.51	7.88	9.10	6.44	10.45	6.40	6.25	6.34	8.15	11.30	11.30	13.05	13.50
Seattle	6.81	8.44	.....	7.70	.....	6.63	6.50	6.50	8.85	.....	.....	.....	.....
St. Louis	5.73	6.60	8.13	5.77	7.66	6.07	6.02	5.75	6.68	10.05	10.38	11.73	12.03
St. Paul*	6.14	6.92	8.45	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

**BASE QUANTITIES** (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.

EXCEPTIONS: (\*) 500 to 1499 lb.

## STAINLESS STEELS

Base price, cents per lb, f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	45.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

**STAINLESS STEEL PRODUCING POINTS—Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2; (type 316 add 4.54) J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, I; Bridgeville, Pa., U2; New Castle, Ind., I3; Ft. Wayne, J4; Lockport, N. Y., R4.

**Strip:** Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; (type 316 add 4.54); W, Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Lockport, N. Y., S4; Sharon, Pa., S1 (type 301 add 4.54); Butler, Pa., A4; Wallingford, Conn., W1.

**Bars:** Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4.

**Wires:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; F. Wayne, J4; Trenton, N. J., R4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, F1; Syracuse, C11; Bridgeville, U2.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

**Plates:** Brackenridge, Pa., A3 (type 416 add 4.54); Butler, Pa., A7; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Lockport, N. Y., S4; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, O., R3.

**Forged discs, die blocks, rings:** Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

**Forging billets:** Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

**ALLEGHENY LUDLUM**—Slightly higher on Type 301; slightly lower on others in 300 series.

**WASHINGTON STEEL**—Slightly lower on 300 series except where noted.

**-Miscellaneous Prices-**

## **PIPE AND TUBING**

**Base discounts, f.o.b. mills. Base price about \$200 per net ton.**

	BUTTWELD												SEAMLESS												
	3½ In.	¾ In.	1 In.	1¼ In.	1½ In.	2 In.	2½ In.	2 In.	2½ In.	3 In.	2 In.	2½ In.	3 In.	2 In.	2½ In.	3 In.	2 In.	2½ In.	3 In.	2 In.	2½ In.	3 In.	2 In.	2½ In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	
Sparrows Pt. B3..	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Cleveland R3..	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Oakland K1..	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh J3..	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.0	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5	.....	.....	.....	.....	
Pittsburgh N2..	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5	.....	.....	.....	.....	
Alten, III. L1..	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Sharon M3..	36.0	13.0	39.0	17.0	41.5	21.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh N1..	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	32.5	34.5	.....	.....	.....	.....	.....	.....	.....	
Wheeling W5..	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wheatland W4..	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.0	42.5	21.0	43.0	21.5	43.5	22.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Youngstown Y1..	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5	.....	.....	.....	.....	
EXTRA STRONG PLAIN ENDS																									
Sparrows Pt. B3..	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland R3..	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oakland K1..	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh J3..	35.5	13.5	39.5	17.5	41.5	21.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5	.....	.....	.....	.....	
Pittsburgh N2..	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5	.....	.....	.....	.....	
Alten, III. L1..	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39	21.0	40.0	21.5	40.5	22.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Sharon M3..	35.5	14.0	39.5	18.0	41.5	21.5	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh N1..	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	33.0	36.5	.....	.....	.....	.....	.....	.....	.....	
Wheeling W5..	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	33.0	36.5	.....	.....	.....	.....	.....	.....	.....	
Wheatland W4..	35.5	13.5	39.5	17.5	41.5	21.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Youngstown Y1..	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5	.....	.....	.....	.....	

**Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis.** For each 1¢ change in zinc, discounts vary as follows:  $\frac{3}{4}$  in.,  $\frac{3}{4}$  in., and 1 in., 1 pt.;  $\frac{1}{4}$  in.,  $\frac{1}{4}$  in., 2 in.,  $\frac{1}{2}$  pt.;  $\frac{1}{2}$  in., 3 in.,  $\frac{3}{4}$  pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.5¢ to 17.5¢ per lb, use 17¢.  
**Threads only, buttweld and seamless,** 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under,  $\frac{3}{4}$  pt. higher discount. Butt weld jobbers' discount, 5 pct. **East St. Louis zinc price now 19.5¢.**

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.50 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	BL Furnace Silvery	Low Phos. Charcoal
Bethlehem <i>B3</i>	54.00	54.50	55.00	55.50			
Birmingham <i>R3</i>	48.38	48.88					
Birmingham <i>W9</i>	48.38	48.88					
Birmingham <i>S5</i>	48.38	48.88					
Buffalo <i>R3</i>	52.00	52.50	53.00				
Buffalo <i>H1</i>	52.00	52.50	53.00				63.75
Chicago <i>I4</i>	52.00	52.50	52.50	53.00			
Cleveland <i>A5</i>	52.00	52.50	52.50	53.00	57.00		
Cleveland <i>R3</i>	52.00	52.50	52.50				
Daingerfield, Tex. <i>L3</i>	48.00	48.50	48.50				
Duluth <i>I4</i>	52.00	52.50	52.50	53.00			
Erie <i>I4</i>	52.00	52.50	52.50	53.00			
Everett, Mass. <i>M6</i>		59.75	60.25				
Fontana <i>K7</i>	58.00	58.50					
Geneva, Utah <i>U1, Y1</i>	52.00	52.50	52.50	53.00			
Granite City, Ill. <i>K3</i>	53.90	54.40	54.90				
Hubbard, Ohio <i>Y1</i>	52.00	52.50	52.50				
Ironton, Utah <i>C7</i>	52.00	52.50					
Jackson, Ohio <i>J1, G2</i>							
Lyle, Tenn. <i>T3</i>						62.50	
Menomonie <i>P6</i>	54.00						66.00
Neville Island <i>P4</i>	52.00	52.50	52.50	53.00			
Pittsburgh <i>U1</i>	52.00				53.00		
Sharpsville <i>S3</i>	52.00	52.50	52.50	53.00			
Steelton <i>B3</i>	54.00	54.50	55.00	55.50			
Swedenell <i>A2</i>	56.00	56.50	57.00	57.50			
Toledo <i>I4</i>	52.00	52.50	52.50	53.00			
Troy, N. Y. <i>R3</i>	54.00	54.50	55.00			60.00	
Youngstown <i>Y1</i>	52.00	52.50	52.50	53.00			
N. Tonawanda, N. Y. <i>T1</i>							

**DIFFERENTIALS:** Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phosphorus, 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over one pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add \$1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrailon on picras is \$1 over cammarable silvery iron.

#### **BOILER TUBES**

Per 100 ft. cut, 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
<b>Babcock &amp; Wilcox.</b>	2	13	22.67	25.66	21.99	25.86
	2½	12	39.48	55.84	29.57	54.76
	3	12	33.90	59.50	32.39	55.78
	3½	12	42.37	49.89	41.10	48.39
	4	10	52.60	61.98	51.03	60.62
<b>National Tube.</b>	2	13	21.62	26.48	—	—
	2½	12	29.65	36.32	—	—
	3	12	34.00	41.64	—	—
	3½	11	40.34	49.41	—	—
	4	10	51.21	62.72	—	—
<b>Pittsburgh Steel.</b>	2	13	—	27.06	—	—
	2½	12	30.49	37.15	—	—
	3	12	34.95	42.59	—	—
	3½	11	41.48	50.54	—	—
	4	10	52.65	64.10	—	—

## **CAST IRON WATER PIPE**

	<i>Per Net Ton</i>
6 to 24-in., del'd Chicago	\$105.30 to \$108.80
6 to 24-in., del'd N.Y....	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipment less .....	\$123.00 to \$130.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

**C-R SPRING STEEL**

Cents Per Lb. F.o.b. Mill	CARBON CONTENT				
	0.26	0.41	0.61	0.81	1.06
	0.40	0.60	0.80	1.05	1.35
Bridgeport, Conn. <i>S7</i>	5.35	6.80	7.60	9.35	11.65
Carnegie, Pa. <i>S9</i>	6.60	8.80	7.40	9.35	11.65
Cleveland <i>A5</i>	4.65	6.45	7.40	9.35	11.65
Detroit <i>D1</i>	5.60	6.85	7.25	—	—
New Castle, Pa. <i>B4</i>	5.35	6.80	7.40	9.3	—
New Haven, Conn. <i>D1</i>	5.85	6.75	7.35	—	—
Sharon, Pa. <i>S1</i>	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. <i>W3</i>	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. <i>A5</i>	4.95	6.75	7.70	9.65	11.65
Youngstown <i>C5</i>	6.80	7.60	9.35	—	—

#### **MERCHANT WIRE PRODUCTS**

Cut Nails, carloads, base \$7.35 per 100 lb. (less 2½ to jobbers), at Caneshbeckon, Pa., (42), Wheeling, W. Va. (W5), \$7.15.

\* Alabama City and So. Chicago don't include the area.

## Miscellaneous Prices

### RAILS, TRACK SUPPLIES

	No. 1 Std.	Light Rail	Joint Bars	Track Spikes	Arches	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer UI.	3.60	4.00	4.70			6.15		
Chicago R3.						9.35		
Cleveland R3.	3.60	4.00						
Easley T2.	3.60	4.00		6.15	5.60	4.50	9.30	
Fairfield T2.	3.60	4.00		4.70	6.15	5.60	4.50	
Gary UI.	3.60	4.00				5.60	4.50	
Ind. Harbor I3.	3.60	4.00		4.70	6.15	5.60	4.50	
Joliet UI.	4.00					6.40		
Kansas City S2.	3.60	4.00	4.70			4.50		9.35
Lackawanna B3.	3.60	4.00				6.15	9.35	9.85
Lebanon B3.	3.60	4.00				9.35	4.50	9.85
Minneapolis C5.	3.60	4.00				9.35	4.50	9.85
Pittsburgh R3.	3.60	4.00				9.35	4.50	9.85
Pittsburgh P5.	3.60	4.00				9.35	4.50	9.85
Pittsburgh J3.	3.60	4.00				6.15	4.50	9.85
Pitt., Cal. C7.	3.60	4.00				6.45	4.50	9.85
Seattle B2.	3.60	4.00				6.45	4.50	9.85
St. Louis B3.	3.60	4.00				6.15	4.50	9.85
Struthers Y1.	3.60	4.00				6.15	4.50	9.85
Toronto C7.	3.60	4.00				6.15	4.50	9.85
Youngstown R3.	3.60	4.00				6.15	4.50	9.85

### TOOL STEEL

F.o.b. mill

	W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	—	\$1.505
18	4	1	—	—	—	\$1.65
18	4	2	—	—	—	81.00
1.5	4	1.5	8	—	—	96.50
6	4	2	6	—	—	96.50
High-carbon chromium						63.50
Oil hardened manganese						35¢
Special carbon						32.5¢
Extra carbon						27¢
Regular carbon						23¢
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.						

### CLAD STEEL

	Stainless-carbon	Plate	Sheet
No. 304, 20 pct.			
Cooatesville, Pa. L4.		*29.5	
Washington, Pa. J2.		*29.5	
Clymont, Del. C4.		*28.00	
Conshohocken, Pa. A2.		*27.50	
New Castle, Ind. J2.		*26.50	*25.50
Welded-carbon			
10 pct Coatesville, Pa. L4.		32.5	
10 pct Coatesville, Pa. L4.		40.5	
Monel-carbon			
10 pct Coatesville, Pa. L4.		33.5	
No. 303 Stainless-copper stainless, Carnegie, Pa. A4.		77.00	
Aluminized steel sheets, hot dip, Butler, Pa. A7.		7.75	

\*Includes annealing and pickling, or sandblasting.

### ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in. in.	Length in. in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
5.70 & 15	48, 60	19.57
5.80 & 85	48, 60	20.95
6.65	40	21.50
4, 5	40	22.61
6.30 & 75	24, 30	23.15
5.95 & 45	24, 30	25.36
5.95 & 40	24, 30	25.36
CARBON		
10	100, 110	8.03
10	65, 110	8.03
25	65, 110	8.03
25	65, 84, 110	8.03
25	72 to 104	1.03
17	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

### FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Price, net ton; Effective CaF<sub>2</sub> content: 70% or more \$43.00 50% or less 40.00

### BOLTS, NUTS, RIVETS, SCREWS

#### Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

#### Nuts, Hot Pressed, Cold Punched—Sq.

##### Pot Off List

	Less	Less
Keg.	K.	K.
Reg.	Hvy.	
1/2 in. & smaller. 15	28 1/2	15 23 1/2
9/16 in. & 5/8 in. 13	35	6 1/2 21
3/4 in. to 1 1/4 in. inclusive . . . . .	9 23	1 16 1/2
1 1/4 in. & larger. 7 1/2	22	1 16 1/2

#### Nuts, Hot Pressed—Hexagon

	Reg.	Less
1/2 in. & smaller. 26	37	22 34
9/16 in. & 5/8 in. 23	35	17 1/2 30 1/2
3/4 in. to 1 1/4 in. inclusive . . . . .	19 1/2 31 1/2	12 25
1 1/4 in. & larger. 12	25	6 1/2 21

#### Nuts, Cold Punched—Hexagon

	Reg.	Less
1/2 in. & smaller. 26	37	22 34
9/16 in. & 5/8 in. 23	35	17 1/2 30 1/2
3/4 in. to 1 1/4 in. inclusive . . . . .	19 1/2 31 1/2	12 25
1 1/4 in. & larger. 12	25	6 1/2 21

#### Nuts, Semi-Finished—Hexagon

	Reg.	Less
1/2 in. & smaller. 35	45	23 1/2 29 1/2
9/16 in. & 5/8 in. 29 1/2	40 1/2	23 34
3/4 in. to 1 1/4 in. inclusive . . . . .	24 36	15 28 1/2
1 1/4 in. & larger. 13	26	8 1/2 23

#### 7/16 in. & smaller

	Reg.	Less
7/16 in. & smaller	35	45
1/2 in. thus 5/8 in.	28 1/2	39 1/2

#### 1/2 in. to 1 1/2 in. inclusive . . . . .

	Reg.	Less
1/2 in. to 1 1/2 in. inclusive . . . . .	26	37

#### Stove Bolts

##### Pot Off List

Packaged, steel, plain finished. 48-10  
Packaged, plate finish . . . . . 31-10  
Bulk, plain finish\*\* . . . . . 62\*

\*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. or shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

\*\*Zinc, Parkerized, cadmium or nickel plated finishes add 5¢ per lb net. For black oil finish, add 2¢ per lb net.

#### Rivets

##### Base per 100 lb

1/2 in. & larger	\$7.85

#### Cap and Set Screws

##### (In bulk)

##### Pot Off List

	Less	Case	C.
1/4 in. & smaller x 6 in. & shorter	15	28 1/2	
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2	30 1/2	
3/4 in. & larger x 6 in. & shorter	17 1/2	29 1/2	
All diam. longer than 6 in.	14	27 1/2	
Lag, all diam. x 6 in. & shorter	23	35	
Lag, all diam. longer than 6 in.	21	33	
Plow bolts	34	...	

#### Machine and Carriage Bolts

##### Pot Off List

	Less	Case	C.
1/4 in. & smaller x 6 in. & shorter	15	28 1/2	
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2	30 1/2	
3/4 in. & larger x 6 in. & shorter	17 1/2	29 1/2	
All diam. longer than 6 in.	14	27 1/2	
Lag, all diam. x 6 in. & shorter	23	35	
Lag, all diam. longer than 6 in.	21	33	
Plow bolts	34	...	

### REFRACTORIES

#### Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5) . . . . .	\$94.60
No. 1 Ohio . . . . .	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. . . . .	88.00
No. 2 Ohio . . . . .	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50) . . . . .	13.75

#### Silica Brick

Mt. Union, Pa., Ensley, Ala. . . . .	\$94.60
Childs, Pa. . . . .	89.00
Hays, Pa. . . . .	100.10
Chicago District . . . . .	104.50
Western Utah and Calif. . . . .	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago . . . . .	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) . . . . .	16.50
Silica cement, net ton, bulk, Hays, Pa. . . . .	18.70
Silica cement, net ton, bulk, Ensley, Ala. . . . .	17.60
Silica cement, net ton, bulk, Chicago District . . . . .	17.60
Silica cement, net ton, bulk, Utah and Calif. . . . .	24.70

#### Chrome Brick

Per Net Ton	
Standard chemically bonded bolt, Chester . . . . .	\$82.00

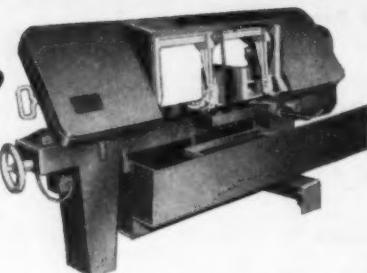
#### Magnesite Brick

Per gross ton


<tbl\_r

## GET ACCURACY that SAVES STOCK...

...get  
**Kalamazoo**  
**METAL**  
**CUTTING**  
**BAND SAWS**



Here's real precision metal sawing that cuts waste to a minimum, saves hard-to-get stock. Kalamazoo Band Saws cut bars, rounds, flats, angles, odd shapes to within a few thousandths of size. What's more, there's an absolute minimum of kerf and no burr.

You can get Kalamazoo Metal Cutting Band Saws in three sizes ... for cutting 6" to 12" rounds, 6" x 10" to 12" x 20" flats. Each model can be had with coolant system for continuous cutting. Each is available with casters for complete portability. Write for details on the many exclusive Kalamazoo features that spell better cutting at lowest cost to you.

MACHINE TOOL DIVISION

**Kalamazoo TANK and SILO CO.**  
516 HARRISON ST., KALAMAZOO, MICHIGAN

### Ferroalloy Prices

#### Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si)	
0.06% C . . . 30.50	0.20% C . . . 23.50
0.10% C . . . 30.00	0.50% C . . . 23.25
0.15% C . . . 29.75	1.00% C . . . 23.00
2.00% C . . .	23.75
65-69% Cr, 4-8% C . . .	22.00
62-66% Cr, 4-6% C, 6-9% Si . . .	22.00

#### S. M. Ferrochrome

Contract price, cents per pound, chrome contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads . . .	21.50
Ton lots . . .	23.75
Less ton lots . . .	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads . . .	27.75
Ton lots . . .	30.00
Less ton lots . . .	31.85

#### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.	
--	--

#### Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 87% min. Cr, 1% max. Fe.	
0.10% max. C . . .	\$1.14
0.50% max. C . . .	1.10
9 to 11% C . . .	1.08

#### Low Carbon Ferrochromo Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.	
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.	

#### Calcium-Silicon

Contract price per lb of alloy, dump delivered.	
30-33% Ca, 60-65% Si, 3.00% max. Fe.	19.00
Carloads . . .	22.10
Less ton lots . . .	23.00

#### Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads . . .	20.00
Ton lots . . .	22.30
Less ton lots . . .	23.00

#### CMZ

Contract price, cents per lb of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50.56% Cr, 4-6% Mn, 18.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C	
Ton lots . . .	20.75
Less ton lots . . .	22.00

#### SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, 1/2 in. x 12 mesh.	
Ton lots . . .	17.50
Less ton lots . . .	19.00

#### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.	
Ton lots . . .	15.50
Less ton lots . . .	17.75

#### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 62%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed . . .	18.00
Ton lots to carload packed . . .	19.00
Less ton lots . . .	20.50

#### Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.	
F.O.B. Niagara Falls, Alloy, W. Va.	
Ashtabula, O. . . . .	\$1.85
F.O.B. Johnstown, Pa. . . . .	\$1.87
F.O.B. Sheridan, Pa. . . . .	\$1.85
F.O.B. Etna, Clairton, Pa. . . . .	\$1.88
\$2.00 for each 1% above 82% Mn, penalty, \$2.15 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk . . . . .	18.95
Ton lots . . . . .	18.55

**EASTON**  
**heavy-duty dependability in**  
**yard and factory trailers**



EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH



## This FREE New Booklet Tells You How

In its 28 illustrated pages you'll find the answers to many questions that affect the success of your electroplating on steel. You'll want to read more about:

- Q Which costs more: good electrocleaning or poor electrocleaning? See page 4.
- Q How can cleaning costs be reduced 33% while plating quality is being improved? See pages 7 and 8.
- Q What are four easy ways to improve the average rinse tank? See page 10.
- Q What rinsing fault is "an invitation to trouble" in the plating of high-carbon steel? See page 11.
- Q Why is it better to clean steel with reverse current than with direct current? See pages 12 to 14.
- Q What causes hydrogen embrittlement during electrocleaning? What is the remedy? See pages 15 and 16.
- Q One part chromic acid in 1,000,000 parts of cleaning solution—does that spell D-A-N-G-E-R? See page 16.
- Q How can an ordinary electrocleaning cycle be transformed into an exceptionally good cycle? See Cycle E on page 23.

**FREE** For a copy of "Four good steps toward better electroplating on steel", write to Oakite Products Inc., 30H Rector St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING  
**OAKITE**  
MATERIALS • METHODS • SERVICE  
Technical Service Representatives Located in Principal Cities of United States and Canada

## Ferroalloy Prices

Continued

### Spiegeleisen

	Contract prices gross ton; lump, f.o.b.	16-19% Mn	19-21% Mn
	8% max. Si	8% max. Si	8% max. Si
Palmerton, Pa.	\$74.00		\$75.00
Ton lots	75.00		76.00

### Manganese Metal

	Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	34.75
Ton lots	36.25

### Electrolytic Manganese

	F.O.B. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads	28
Ton lots	30
Less Ton lots	32

### Low-Carbon Ferromanganese

	Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30	
0.07% max. C	25.75	27.60	28.80	
0.15% max. C	25.25	27.10	28.30	
0.30% max. C	24.75	26.60	27.80	
0.50% max. C	24.25	26.10	27.30	
0.75% max. C				
7.00% max. Si	21.25	23.10	24.30	
Alasifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.				
Carloads			9.90	
Ton lots			11.30	
Calcium molybdate, f.o.b. Langeloth, Pa., per pound contained Mo.				\$1.15

### Medium Carbon Ferromanganese

	Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn
	19.15¢

### Silicomanganese

	Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

### Silvery Iron (electric furnace)

	Mn 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$90.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.
Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

### Silicon Metal

	Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

### Silicon Briquets

	Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.
Carloads, bulk	6.95
Ton lots	8.55

### Electric Ferrosilicon

	Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.
25% Si	20.00
50% Si	12.40
90.95% Si	17.50
75% Si	14.30
85% Si	15.55

### Calcium Metal

	Eastern zone contract prices, cents per pound of metal, delivered.
Cast	\$2.05
Turnings	\$2.95
Distilled	\$3.75
Ton lots	2.40
Less ton lots	3.30
	4.55

### Ferrocolumbium, 50-60%, 2 in.

	x D, contract basis, delivered, per pound contained Cb.
Ton lots	\$4.90
Less ton lots	4.95

Turn Page

## PNEUMATIC HOIST with Rotary Air Motor

Capacities 250  
lbs. to 1 ton  
Fast Lifting  
Speeds



- Worm Geared
- Compact—Light Weight
- Exceptionally Smooth Running
- Close, Sensitive Control

PT Hoist shown with monorail trolley; can also be furnished with upper suspension hook. Write for P.T. Bulletin 708.

DETROIT HOIST & MACHINE CO.  
8224 Morrow St., Detroit 11, Mich.  
Designers and Manufacturers Since 1905

METAL STAMPING FACILITIES

by Lansing  
at your Service for...

TRANSPORTATION EQUIPMENT  
HOUSEHOLD APPLIANCES  
ELECTRICAL EQUIPMENT  
INDUSTRIAL EQUIPMENT  
FARM IMPLEMENTS

Lansing Stamping Co.  
ESTABLISHED 1914  
LANSING 2 MICHIGAN

# ARMSTRONG Drop Forged LATHE DOGS



**ARMSTRONG**  
Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for Catalog

See us at Booth 133 ASTE Show, Chicago  
**ARMSTRONG BROS. TOOL CO.**  
5209 West Armstrong Ave., Chicago 30, Ill.

New York and San Francisco

## —Ferroalloy Prices— Continued

<b>Ferro-Tantalum-Columbium</b> , 20% Ta, 40% Cr, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cr plus Ta .....	\$1.71
<b>Ferromolybdenum</b> , 55-75%, f.o.b. Langlooth, Pa., per pound contained Mo .....	\$1.41
<b>Ferrophosphorus</b> , electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton .....	\$65.00
10 tons to less carload .....	\$75.00
<b>Ferrotitanium</b> , 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti .....	\$1.35
<b>Ferrotitanium</b> , 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti .....	\$1.35
Less ton lots .....	\$1.35
<b>Ferrotitanium</b> , 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton .....	\$177.00
<b>Ferrotungsten</b> , standard, lump or $\frac{1}{4}$ x down, packed, per pound contained W, 6 ton lots, delivered .....	\$5.00
<b>Ferrovanadium</b> , 35-55% contract basis, delivered, per pound, contained V.	
Openhearth .....	\$3.00-\$3.10
Crucible .....	\$1.00-\$1.20
High speed steel (Primos) .....	\$3.00-\$3.10
<b>Molybde oxide</b> , briquets or cans, per lb contained Mo, f.o.b. Langlooth, Pa., bags, f.o.b. Washington, Pa., Langlooth, Pa. ....	\$1.16
<b>Simanal</b> , 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump .....	14.00
Ton lots, bulk lump .....	15.75
Less ton lots, lump .....	16.25
<b>Vanadium Pentoxyde</b> , 86-89% $V_2O_5$ contract basis, per pound contained $V_2O_5$ .....	\$1.11
<b>Zirconium</b> , 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots .....	21.00
<b>Zirconium</b> , 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk .....	7.00
<b>Boron Agents</b>	
<b>Borosil</b> , contract prices per lb of alloy, del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B .....	\$5.35
<b>Bortam</b> , f.o.b. Niagara Falls	
Ton lots, per pound .....	45¢
Less ton lots, per pound .....	50¢
<b>Corbortam</b> , Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound .....	10.00
<b>Ferroboron</b> , 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots, f.o.b. Wash., Pa.; 100 lb up	
10 to 14% B .....	.85
14 to 19% B .....	1.20
19% min. B .....	1.60
<b>Grinal</b> , f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1 .....	\$1.00
No. 6 .....	.85
No. 79 .....	.85
<b>Manganese-Boron</b> , 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots .....	1.44
Less ton lots .....	1.57
<b>Nickel-Boron</b> , 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots .....	1.90
<b>Sileaz</b> , contract basis, delivered.	
Ton lots .....	45.00

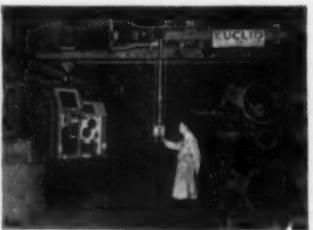
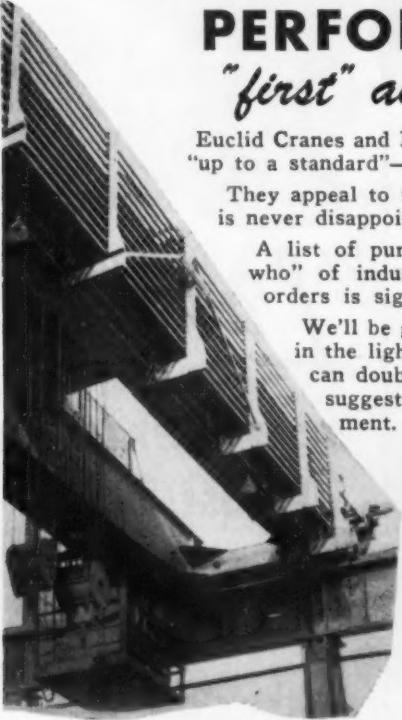
## PERFORMANCE "first" and "foremost"

Euclid Cranes and Hoists have always been built "up to a standard"—never "down to a price."

They appeal to the seeker for quality and he is never disappointed.

A list of purchasers reads like a "who's who" of industry. The record of repeat orders is significant and impressive.

We'll be glad to discuss your problems in the light of our long experience and can doubtless offer some constructive suggestions as to methods and equipment.



Write for Catalogs.

**THE EUCLID CRANE & HOIST COMPANY**  
1361 CHARDON ROAD, EUCLID, OHIO

**EUCLID**  
CRANES  
AND  
HOISTS  
Raise Profits

# FREE! 61 PAGES OF FACTS FIGURES PHOTOS ON BARREL FINISHING



These 3 amazing booklets give you the inside story of advanced barrel finishing. Complete facts on sensational new developments in barrel finishing techniques - equipment - compounds.

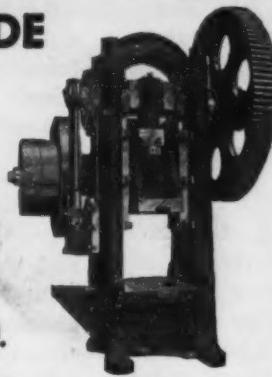
Write Dept. H-5 For FREE Booklets

**ALMCO Supersheen**  
AMERICA'S LARGEST MFGR. OF ADVANCED BARREL FINISHING EQUIPMENT, MATERIALS & COMPOUNDS  
ALBERT LEA, MINNESOTA

## STRAIGHT SIDE PRESSES

The complete line of efficient Zeh & Hahnenmann presses includes straight side presses, either single or double crank, for heavy blanking and forming operations. These are made with either a solid frame or a frame built up with the rods as illustrated. Ask for the Z & H catalog of modern presses.

**ZEH & HAHNEMANN CO.**  
Avenue A & Vanderpool St.  
NEWARK, N. J.



**Hartford**

**STEEL BALLS**  
A PRODUCT OF INGENIOUS MACHINERY AND SKILLED CONNECTICUT OPERATORS

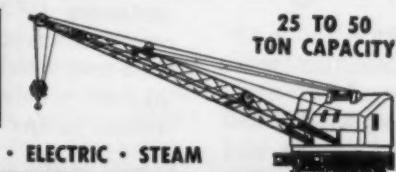
STEEL, BRONZE, MONEL, STAINLESS STEEL AND ALL WORKABLE MATERIALS  
Any Quantities. THE HARTFORD STEEL BALL CO., HARTFORD 6, CT.



GRAY, Originator of First Practical Metal Cutter or Nibbler. Received N.A.M. Pioneer Award.

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet and Plate Shops.

GRAY MACHINE CO., Box 596, PHILADELPHIA, PA.



**OHIO LOCOMOTIVE CRANES**

DIESEL • GASOLINE • ELECTRIC • STEAM

THE OHIO LOCOMOTIVE CRANE CO.  
BUCKEY, OHIO

MORE THAN A "COOLANT"  
IS NEEDED . . .



**D.A. Stuart Oil Co.**  
EST. 1893  
2737 SOUTH TROY ST., CHICAGO, ILLINOIS

May 1, 1952

# MUNDT

## PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

Write for New Catalog of Patterns



TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

**CHARLES MUNDT & SONS**  
56 FAIRMOUNT AVE. JERSEY CITY, N. J.



## WASHERS TO SUIT YOUR NEEDS

STANDARD - BEVEL - SQUARE - SPECIAL  
GALVANIZED OR CADMIUM PLATED  
ALSO MANHOLE STEPS

**NICETOWN PLATE WASHER CO., Inc.**

JUNIATA AND CLARISSA STS.  
NICETOWN PHILADELPHIA 40, PA.

**WHEELING STEEL CORPORATION**  
WHEELING, WEST VIRGINIA

**COP-R-LOY PIPE-SHEETS**

**Ductillite**  
THE MODERN TIN PLATE  
LA BELLE CUT NAILS



## CONSIDER GOOD USED EQUIPMENT FIRST

### AIR COMPRESSORS

Ingersoll Rand 33" x 20½" x 24" Complete with 435 H.P. G.E. Syn. Motor 2300/3/60. 2873 cu. ft. Worthington 29" x 21" x 18½" x 21". Complete with Elec. Equipment.

### BELT GRINDING UNIT

Hill Clutch & Machine & Fdry. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to ¾" thick x 30" wide x 30' long.

### BENDING ROLL

No. 4 Hilles & Jones Pyramid Type Plate Bending Roll. Capacity 16' x ¾" Plate Complete with Electrical Equipment.

### BULLDOZER

#7 William White Bulldozer, Motor Driven with 50 H.P. Motor. 440 v. 3 ph. 60 cycle. Face of Crosshead 20" x 90", Movement of Crosshead 24".

### CRANE

5 ton Shaw 70' Span, Three 230 Volt D.C. Motors Equipt for Magnet Operation, without Magnet.

### DIE CASTING MACHINE

Model BA-12 KUX Die Casting Machine, Air Operated, Plunger Gooseneck Type for zinc, lead and tin. Die space between bars 12½" x 12¼", Die Separates 8". NEW 1949, never used.

### FLANGING MACHINES

¾" McCabe Pneumatic Flanging Machine, Pneumatic Holdowns, Circle Flanging Attachment and numerous dies. No. 3 Blue Valley Flanging Machine. Will flange flat heads from 40" to 10" or 12" dia. Silent chain drive with A.C. Motor. Equipped with air cylinder and hydraulic pump.

### FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.

15 ton Herroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.

25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 v. 3 ph. 60 cy.

### GEAR REDUCER

600 H.P. Farrell Birmingham Herringbone Gear Unit. R.P.M. 7.20 to 74.54 NEW.

### HAMMER

10,000 lb. Chambersburg Steam Drop Hammer.

### PLANERS

48" x 48" x 20' Cincinnati, Four Head 48" x 48" x 12' Niles-Bement-Pond, Four Head 60" x 40" x 12' Niles-Bement-Pond, Four Head 72" x 72" x 12' Niles-Bement-Pond, Four Head

### PLATING MACHINE

Type "B" Crown Full Automatic Nickel & Chrome Plating Machine. Max. Work Size 16" wide x 36" deep x 4" thick.

### PRESS—KNUCKLE JOINT

1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" Stroke, 18" Shut Height.

### ROLLING MILLS

8" x 10' Schmitz Single Stand Two High With Friction Drive Rewinder. 12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Caster.

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.

### STRAIGHTENER

¾" Shuster Straightening & Cut-Off Machine 30" Cut-Off, Complete with 15 H.P. A.C. Motor.

### TESTING MACHINES

300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine. 100,000 lb. Olsen Universal Hydraulic Testing Machine. Three Dial Type.

### TRIMMING LINE

#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ½" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2½" max.

### WELDERS

700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide. 40 KVA Sclaky, Spot Welder, 36" Throat 440/3/60 operation.

### RITTERBUSH & COMPANY, INC.

50 Church Street, New York 8, N.Y.  
Phone—Cort 7-3437

# The Clearing House

## NEWS OF USED, REBUILT AND SURPLUS MACHINERY

The turtle has pulled its head completely into the shell. Office of Price Stabilization which has been "working" on an amendment to CPR 80, permitting used machine tool dealers to price under a more favorable base, has clamped iron-clad secrecy about its willingness or unwillingness to issue the amendment.

Issuance date of the long-awaited amendment is uncertain but it's reported that an attempt may be made to have it out before Ralph Irwin, of OPS, speaks at the Machinery Dealers National Assn. convention on May 8.

**Timetable of Stalling**—OPS tactics have been masterpieces of stalling. Used machinery's industry advisory committee recommended changes to CPR 80 early in December. Pricing base under CPR 80 is Jan. 25, 1951. MDNA suggested that rising costs after that date should be allowed for under a more equitable base—Dec. 15, 1951.

OPS offered no objection. MDNA also sought to make certain revisions to percentages to provide a fairer overall pricing picture—without adding to inflation. OPS offered no dissent. A tentative date of Mar. 24 was set for the amendment. It never was issued.

The industry committee asked for another meeting to see a draft of the amendment—for comment and criticism. OPS consented to the meeting but they had no draft.

**Tough on Industry**—There are motives behind this seeming "madness." Despite the Administration's willingness to play political footsie with the steel union and contribute to inflation by granting a whopping wage increase, its generosity does not extend to industry. OPS can be expected to stay tough on any industry suggestion that even hint at higher prices.

Secondly, OPS believes that business in used machine circles is not what it could be—with the possible exception of the West Coast. OPS

may believe that price ceilings on the bulk of tools covered by CPR 80 may not hold up. This may make the amendment unnecessary. OPS tendency is to remove price controls when specific industries can't stay up to ceilings.

As things stand now, OPS is playing a waiting game. Complicating matters for the trade is insistence by some plants for near-ceiling prices for their machines. Exaggerated ideas on what machines are worth is cutting down not only profits—but trading.

**Pittsburgh Market**—Doing business under price controls raises more than one problem for used and rebuilt equipment dealers. Widespread knowledge of ceiling prices makes it difficult or impossible to do any real horse-trading.

In many cases offers to sell equipment quote the ceiling price for the individual machines. The dealer is offered the equipment at 10 pct off ceiling. In effect, this means that the dealer would merely operate as an agent of the seller in disposing of the machine.

**No. Savvy**—One headache of OPS is determining if ceiling prices are being violated at auction sales. OPS men try to sit in on these auctions, but quite often they can't be sure whether ceilings are being exceeded.

Recently, an OPS man plaintively asked a dealer for assistance in deciding the question. In most instances OPS must depend on complaints from buyers. Generally, used and rebuilt equipment poses no great problem for the price controllers in any district.

**Distributor**—Duquesne Electric & Manufacturing Co., announced it has been appointed distributor in Western Pennsylvania and some sections of Ohio and Maryland for Reliance Electric & Engineering Co., Cleveland. Duquesne expects to have for immediate delivery motors up to 200 h.p., including totally-enclosed fan cooled motors.